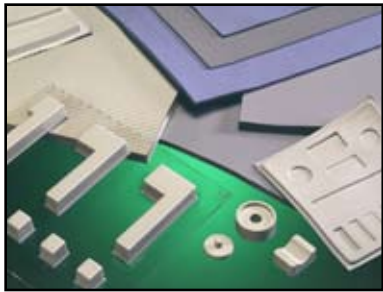
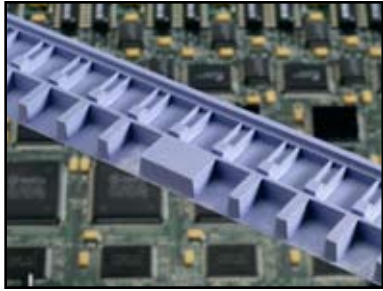


# Thermal Management Materials **SELECTOR GUIDE** (Typical Properties)



THERM-A-GAP™								
THERMALLY CONDUCTIVE GAP FILLERS								
Material	Color	Standard Thickness Range* mm (inches)	Carrier	Thermal Conductivity (ASTM D5470), W/m-K	Conformability Rating (1= Softest 5 = Least Soft)	Flammability Rating (UL 94), See UL File E140244 for Details	RoHS Compliant	Comments
976	Gold	1.00 - 5.0 (0.040 - 0200)	None	6	1	V-0	Yes	Highest thermal conductivity, conformable material
A579 / G579	Pink	0.50 - 5.0 (0.020 - 0.200)	A = Aluminum w/PSA G = Clean-break fiberglass no PSA	3.0	1	V-0	Yes	Superior conformability & thermal performance
A569 / G569	Gray	0.50 - 5.0 (0.020 - 0.200)	A = Aluminum w/PSA G = Clean-break fiberglass no PSA	1.5	1	V-0	Yes	Superior conformability, most economical
974	Blue	0.50 - 1.5 (0.020 - 0.060)	Unsupported	5.0	4	Not Tested	Yes	High thermal conductivity
G974	Blue	0.25 - 1.5 (0.010 - 0.060)	Fiberglass with PSA	4.0	4	V-0	Yes	High thermal conductivity with fiberglass
575-NS	Yellow	0.50-2.50 (0.020 - 0.100)	Unsupported	1.2	5	Not Tested	Yes	<b>Non-Silicone</b> gap pad

**\*Other thicknesses (up to ~25.4mm thick) and custom-molded shapes are available. Contact Applications Engineering for details.**

THERM-A-GAP™ Gels						
Dispensable, Very Low Compression Force, Thermal Gap Fillers (No Cure Required) for Automated Dispensing						
Material	Thermal Conductivity (ASTM D5470), W/m-K	Percent deflection at various force levels (ASTM C165 Modified)			RoHS Compliant	Comments
		0.5 kg (1 lb)	1.4 kg (3 lb)	2.3 kg (5 lb)		
T630	0.7	36 %	54 %	63 %	Yes	Fully-cured, dispensable, extremely conformable
T630G	0.7	36 %	54 %	63 %	Yes	T630 w/0.25mm glass beads as dielectric compression stops

Available in large containers (1 and 5 gallons) for High Volume Manufacturers. Large formats require customized dispensing equipment



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## THERM-A-FORM™ COMPOUNDS

### Thermally Conductive Silicone Compounds

Compound	Color	Thermal Conductivity (ASTM D5470), W/m-K	Hardness (Shore A) ASTM D2240	RoHS Compliant	Components	Approximate Cure Time @ Temperature	Comments
T647*	Gray	3.00	50	Yes	2-part	48 Hours @ 25° C 10 Minutes @ 150° C	1:1 ratio. Highest thermal performance
T644*	Pink	1.20	15	Yes	2-part	48 Hours @ 25° C 30 Minutes @ 75° C 3 Minutes @ 150° C	1:1 ratio. Good thermal conductivity
T642	Blue	1.20	70	Yes	2-part		10:1 low extractable silicone compound. Good thermal conductivity
T646*	Tan	0.90	50	Yes	2-part		1:1 ratio. Often used in high-volume, automated dispensing
1642	Blue	0.95	85	Yes	2-part	1 Week @ 25° C 4 Hours @ 65° C 1 Hour @ 100° C 5 Minutes @ 150° C	100:3 ratio potting compound. Comes bundled as a kit with primer CHO-BOND® 1087
1641	White	0.90	78	Yes	1-part	48 Hours @ 25° C @ 50% Relative Humidity	<b>Moisture cure</b> , encapsulant, potting compound. Comes bundled as a kit with primer CHO-BOND® 1086

\* These compounds are available in large formats for High Volume Manufacturers. Large formats require customized dispensing equipment

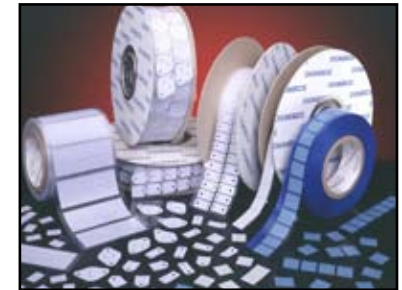
## CHO-THERM®

### Thermally Conductive Electrical Insulators available with and without Pressure Sensitive Adhesive (PSA)

Material	Color	Standard Thickness mm (inches)	Dielectric Strength (VAC)	Thermal Impedance** (ASTM D5470), °C-cm <sup>2</sup> /W (°C-in <sup>2</sup> /W)	Flammability Rating (UL 94), See UL File E140244 for Details	RoHS Compliant	Comments
T500	Green	0.25 (0.010)	5,000	1.20 (0.19)	V-0	Yes	Best thermal performance
1678	Pink	0.25 (0.010)	2,500	1.26 (0.20)	V-0	Yes	Value-priced with good thermal and electrical performance
1671*	White	0.38 (0.015)	4,000	1.48 (0.23)	V-1	Yes	High thermal performance and proven reliability in aerospace applications
T609	Light Green	0.25 (0.010)	4,000	2.10 (0.33)	V-0	Yes	Best value for moderate to high performance pad
T444	Beige	0.08 (0.003)	5,000	2.40 (0.37)	Not Tested	Yes	<b>Non-silicone</b> , Kapton® Film
1674	Blue	0.25 (0.010)	2,500	2.60 (0.41)	V-0	Yes	General Purpose commercial grade insulator
T441-08	Pink	0.20 (0.008)	8,500	2.60 (0.41)	V-0	Yes	Excellent dielectric strength at high humidity. Commercial grade insulator
T441-13	Pink	0.33 (0.013)	11,500	3.60 (0.56)	V-0	Yes	
T441-18	Pink	0.46 (0.018)	13,500	4.10 (0.64)	V-0	Yes	

\* 1671 available in custom thicknesses (0.020 to 0.06in Typical)

\*\* Tested without PSA. PSA typically adds 0.30 °C-cm<sup>2</sup>/W (0.05 °C-in<sup>2</sup>/W)

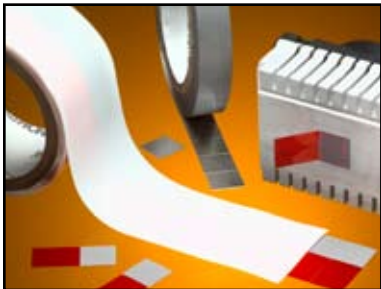
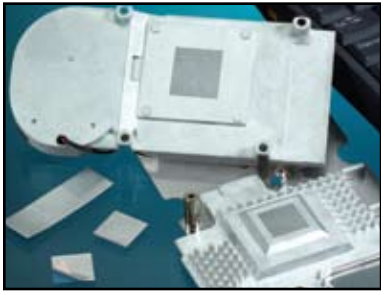


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THERMFLOW®								
Non-Silicone Phase Change Thermal Interface Materials								
Material	Color	Thickness mm (Inches)	Carrier mm (Inches)	Voltage Breakdown (Vac)	Thermal Impedance (Modified ASTM D5470) °C-cm²/W (°C-in²/W) @ 50 psi	Phase-change Temperature °C (ASTM D3418)	RoHS Compliant	Comments
T777 <sup>§</sup>	Gray	0.115 (0.0045)	Free Film	N/A	0.06 (0.01)	45 / 64	Yes	Lowest thermal impedance and optimized end-of-life performance
T557*	Gray	0.125 (0.005)	Free Film	N/A	0.06 (0.01)	45 / 64	Yes	Lowest thermal impedance. Inherently tacky, easy to use
T558**	Gray/Silver	0.115 (0.0045)	0.025 (0.001) Metal Foil	N/A	0.13 (0.02)	45 / 64	Yes	Low thermal impedance. Inherently tacky. Top foil for clean-break
T725***	Pink	0.125 (0.005)	Free Film	N/A	0.26 (0.04)	55	Yes	Inherently tacky and easy to use in assembly. UL 94 V-0 Rated (see UL file #E140244)
T766****	Light Gray/Metallic	0.088 (0.0035) 0.152 (0.006)	0.025 (0.001) Metal Foil	N/A	0.39 (0.06)	55	Yes	Foil provides clean break between heat sink and package
T710 w/PSA****	Light Gray	0.138 (0.0055)	0.051 (0.002) Fiberglass	N/A	1.6 (0.25)	45	Yes	BGA, Microprocessors and power semiconductors. PSA attachment
PC07DM-7	Pink	0.178 (0.007)	0.025 (0.001) Polyester	5,000	1.81 (0.28)	55	Yes	Polyester dielectric layer, inherently tacky, no adhesive required. Offers excellent mechanical and electrical properties

\* US PATENT No. 6,054,198  
 \*\* US PATENT No. 6,054,198  
 \*\*\* US PATENT No. 6,956,739 B2  
 \*\*\*\* US PATENT No. 6,835,453

<sup>§</sup>End user license agreement may apply

THERMATTACH®							
Thermally Conductive Double-Sided Adhesive Tapes							
Material	Thickness mm (Inches)	Carrier	Lap Shear Adhesion (ASTM D1002 AI-AI), kPa (psi) @ 25° C	Thermal Impedance (ASTM D5470), °C-cm²/W (°C-in²/W)	Flammability Rating (UL94), See UL File E140244 for Details	RoHS Compliant	Comments
T418	0.25 (0.010)	Fiberglass	1,034 (150)	7.7 (1.2)	V-0	Yes	Superior attachment strength, acrylic adhesive
T412	0.23 (0.009)	Expanded Aluminum Mesh	480 (70)	2.0 (0.30)	Not Tested	Yes	Highest thermal performance, acrylic adhesive
T411	0.28 (0.011)	Expanded Aluminum Mesh	270 (40)	6.5 (1.0)	Not Tested	Yes	<b>Silicone adhesive</b> , recommended for plastic components
T405-R	0.15 (0.006)	Aluminum	689 (100)	3.4 (0.50)	V-0	Yes	T405 without brominated flame retardant
T414	0.13 (0.005)	Kapton® MT	689 (100)	3.7 (0.60)	V-0	Yes	Electrically insulating acrylic adhesive



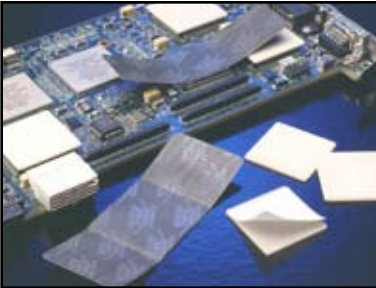
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# Thermal Management Materials **SELECTOR GUIDE** (Typical Properties)



HEAT SPREADERS (T-WING® & C-WING™)								
Material	Thickness mm (inch)	Thermal Conductor	Sizes (Width X Height) mm (inches)		Component Temp Reduction (° C)	Flammability Rating (UL94), See UL File E140244 for Details	RoHS Compliant	Comments
T-WING	0.33 (0.013) 0.63 (0.025)	Copper	50.8 (2.0) X 50.8 (0.5)	76.2 (3.0) X 12.7 (0.5)	16	V-0	Yes	Flexible, low profile heat spreaders laminated with dielectric material on both sides. <b>Silicone</b> PSA, centered for attachment Custom shapes available.
T-WING			76.2 (3.0) X 19.1 (0.75)	76.2 (3.0) X 25.4 (1.0)				
T-WING			101.6 (4.0) X 25.4 (1.0)	101.6 (4.0) X 38.1 (1.5)				
C-WING	0.060 (1.53)	Aluminum Oxide or Aluminum Nitride	Custom Sizes		12	Not Tested	Yes	For EMI-sensitive applications. Low profile heat spreaders with <b>silicone</b> PSA attachment.

Thermal Grease							
High Performance Thermal Grease							
Material	Color	Thermal Impedance above 50°C (Modified ASTM D5470), °C-cm²/W (°C-in²/W)	Thermal Impedance above 65°C (Modified ASTM D5470), °C-cm²/W (°C-in²/W)	Apparent Thermal Conductivity (ASTM D5470), W/m-K	Viscosity cps	RoHS Compliant	Comments
T670	White	0.07 (0.01) @ 69 kPa (10 psi)	0.07 (0.01) @ 69 kPa (10 psi)	3.00	350,000	Yes	High bulk thermal conductivity, can achieve thin bondlines (approx. 0.001 in)
T660	Lt. Gray	0.13 (0.02) @ 69 kPa (10 psi)	0.06 (0.009) @ 69 kPa (10 psi)	0.90	170,000	Yes	Phase Change Technology Requires heating above 62 °C for enhanced performance
T650	Blue	0.13 (0.02) @ 69 kPa (10 psi)	0.13 (0.02) @ 69 kPa (10 psi)	0.80	190,000	Yes	General Purpose Thermal Grease



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