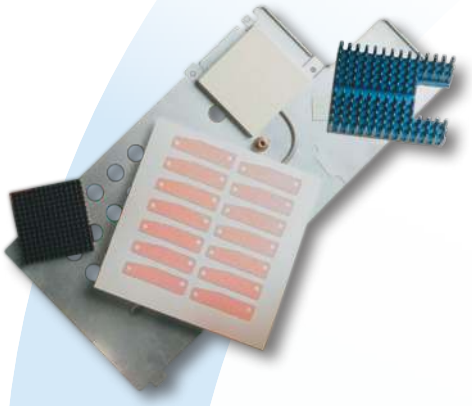
Laird TECHNOLOGIES

Innovative **Technology** for a **Connected** World

Gap Filler Product Line



IT ALL STARTS WITH AN IDEA...

The idea to make devices faster, sleeker, more compact and powerful, yet the challenge is to do so without over-heating.

Laird Technologies' thermally conductive gap fillers are compliant, future-generation cooling materials. We offer the softest, highest thermally conductive gap fillers available (in thicknesses from 0.2mm to 5.08mm).

These gap filler products afford designers and engineers the most flexibility in dimensional tolerances. Extreme compliancy reduces stress on components, while higher thermal conductivity provides the required thermal performance for next-generation designs.

Thermal performance and softness is what Laird Technologies does best. Call us today to discuss your application and order free samples.

Laird Technologies' gap fillers - experience the cooler side of soft.

FEATURES AND BENEFITS

- Compliancy rates up to 50% deflection at 50 psi
- Thermal conductivity range from 1.1 – 6.0 W/mK
- Thicknesses from 0.2mm to 5.08mm

APPLICATIONS

- Notebook computers
- Handheld microprocessor devices
- Telecommunication hardware
- Semiconductor test equipment
- Servers and desktop computers
- Memory modules
- Mass storage devices
- Power conversion equipment
- Flat panel displays
- Audio & video components
- GPS navigation equipment
- Automotive engine control
- LED lighting
- Household appliances
- Lighting ballasts

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Gap Filler Product Line

	TFLEX™ 200V0	TFLEX™ 300	TFLEX™ 500	TFLEX™ HR600 PRELIMINARY	TFLEX™ 600	TFLEX™ 700 PRELIMINARY	TPUTTY™ 502	TPUTTY™ 504	TPLI™ 200	TEST METHOD
Construction & Composition	Ceramic filled silicone sheet	Ceramic filled silicone sheet	Ceramic filled silicone sheet	Ceramic filled silicone sheet	Boron nitride filled silicone sheet	Ceramic filled silicone sheet	Reinforced boron nitride filled silicone sheet	Ceramic filled dispensable silicone gel	Boron nitride filled silicone sheet	
Color	Light Gray	Light Green	Blue	Grey	Blue-Violet	Dark Grey	White	Light Gray	Multiple Colors	Visual
Thickness Range	0.008" (0.20mm)-0.200" (5.08mm)	0.020" (0.50mm)-0.200" (5.08mm)	0.020" (0.5mm)-0.200" (5.08mm)	0.020" (0.5mm)-0.200" (5.08mm)	0.020" (0.5mm)-0.200" (5.08mm)	0.020" (0.5mm)-0.200" (5.08mm)	0.020" (0.5mm)-0.200" (5.08mm)	N/A	0.010" (0.25mm)-0.200" (5.08mm)	
Thickness Tolerance	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 10%	+/- 10%	N/A	+/- 10%	
Density	1.73 g/cc	1.75 g/cc	3.00 g/cc	2.52 g/cc	1.34 g/cc	1.78 g/cc	1.38 g/cc	2.78 g/cc	1.44 g/cc	Helium Pycnometer
Hardness	45 Shore 00	20 Shore 00	40 Shore 00	35 Shore 00	25 Shore 00	50 Shore 00	5 Shore 00	N/A	70 Shore 00	ASTM D2240
Tensile Strength	48 psi	15 psi	66 psi	Pending	15 psi	Pending	N/A	N/A	35 psi	ASTM D412
% Elongation	63	50	57	Pending	75	Pending	N/A	N/A	5	ASTM D412
Outgassing TML (Post Cured)	0.34%	0.56%	0.29% (not post cured)	0.19%	0.13%	Pending	0.11%	0.34%	0.07%	ASTM E595
Outgassing CVCM (Post Cured)	0.10%	0.10%	0.04% (not post cured)	0.07%	0.05%	Pending	0.06%	0.09%	0.02%	ASTM E595
UL Flammability Rating	94 V0	94 V0	94 V0	94 V0	94 V0	94 V0	94 V0	94 V0	94 HB	E180840
Temperature Range	-45°C to 160°C	-40°C to 160°C	-45°C to 200°C	-45°C to 200°C	-45°C to 200°C	-45°C to 200°C	-45°C to 200°C	-45°C to 200°C	-45°C to 200°C	
Thermal Conductivity	1.1 W/mK	1.2 W/mK	2.7 W/mK	3.0 W/mK	3.0 W/mK	5.0 W/mK	3.0 W/mK	1.8 W/mK	6.0 W/mK	Hot disk
Thermal Resistance @ 40 mils, 20 psi @ 1mm, 138KPa	1.57 °C-in2/W 10.13 °C-cm2/W	1.15 °C-in2/W 7.42 °C-cm2/W	0.50 °C-in2/W 3.23 °C-cm2/W	0.35 °C-in2/W 2.26 °C-in2/W	0.62 °C-in2/W 4.00 °C-cm2/W	0.21 °C-in2/W 1.22 °C-in2/W	0.49 °C-in2/W 3.16 °C-cm2/W	N/A N/A	0.37 °C-in2/W 2.45 °C-cm2/W	ASTM D5470 (modified)
Percent Deflection @ 10 psi	5%	21%	10%	10%	20%	15%	25%	N/A	4%	ASTM D575 (modified)
Percent Deflection @ 50 psi	25%	48%	30%	42%	40%	32%	50%	N/A	6%	ASTM D575 (modified)
Percent Deflection @ 100 psi	40%	61%	45%	58%	60%	50%	75%	N/A	10%	ASTM D575 (modified)
Thermal Expansion	229 ppm/°C	754 ppm/°C	37.4 ppm/°C	217 ppm/°C	430 ppm/°C	340 ppm/°C	92 ppm/°C	N/A	51 ppm/°C	IPC-TM-650 2.4.24
Breakdown Voltage	>250 VAC/mil	>250 VAC/mil	>200 VAC/mil	Pending	>200 VAC/mil	>200 VAC/mil	>200 VAC/mil	>500 VAC/mil	>150 VAC/mil	ASTM D149
Volume Resistivity	4 x 10^{13} ohm-cm	6 x 10^{12} ohm-cm	1x 10^{13} ohm-cm	9 x 10^{13} ohm-cm	2 x 10^{13} ohm-cm	1x 10^{13} ohm-cm	5 x 10^{13} ohm-cm	>10^{14} ohm-cm	5 x 10^{13} ohm-cm	ASTM D257
Dielectric Constant @ 1MHz	5.5	5.5	13.6	17.6	3.3	5	3.2	N/A	3.2	ASTM D150

Data for design engineer guidance only. Observed performance varies in application. Engineers are reminded to test the material in application.