



TIM

Thermal Interface Materials



In the frenzied race of electronic world towards more compact designs, working with high powers generates the need to dissipate heat to guarantee the correct functioning of the equipment over time. Among all the different solutions for an easier thermal exchange from power components to heat sinks, the Bergquist (Henkel) Thermal Interface Materials (TIM) are a worldwide standard of high quality and high reliability for almost half a century.



**COMPETENCY
QUALITY
SKILLS**

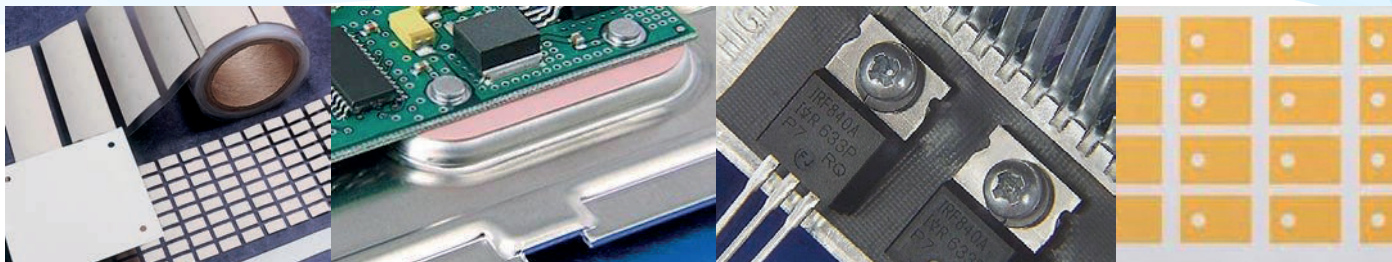
Welt Electronic, Bergquist distributor for over 20 years, has the expertise to work side by side with your technicians to find together the best suitable materials to guarantee a high-quality solution for all your projects.

The skills and efficiency of a modern converting department is the added value that Welt Electronic offers you for a complete service, from the choice of material to the optimized geometry for all your applications.



SIL PAD®

Almost 40 years ago Bergquist set the standard of the first silicone-based elastomeric thermal interface material with the name of SIL PAD®. Since then, the family has been enriched with more products necessary to meet the needs of a rapidly changing electronic market. The SIL PAD® thermal conductive insulator continues to be a clean, efficient and reliable alternative to thermal grease solution for a wide range of applications.



PRODUCT	DESCRIPTION	Color	Thickness (mils/mm)	Hardness (Shore A) ASTM D2240	Thermal Conductivity (W/m*K) ASTM D5470	Thermal Impedance @ 50psi/[3.5 Kg/cm²] (°C*in²/W) (°C*cm²/W) ASTM D5470	Dielectric Breakdown Voltage (V AC) ASTM D149
Silpad 400 (TSP 900)	The thermal conductive insulator with fiberglass reinforcing, progenitor of the Silpad series.	Grey	7 / 0.18	85	0.9	1.13 / 7.29	3500
			9 / 0.23			1.45 / 9.35	4500
Silpad 800 (TSP 1600)	High thermal performances Pad, fiberglass reinforced and with very thin thickness.	Gold	5 / 0.13	91	1.6	0.45 / 2.90	3000
Silpad 900S (TSP 1600S)	The "General-Purpose" thermal conductive insulation material suitable for all power applications.	Pink	9 / 0.23	92	1.6	0.61 / 3.94	5500
Silpad A1500 (TSP A2000)	Pad with fiberglass reinforcement that combines an excellent electrical insulation with a low thermal resistance.	Green	10 / 0.25	80	2.0	0.42 / 2.71	6000
Silpad K6 (TSP K1100)	Pad with polyimide base (Kapton), it guarantees an excellent thermal insulation and good thermal performances.	Dark Green	6 / 0.15	90	1.1	0.49 / 3.17	6000
Silpad K10 (TSP K1300)	Pad with polyimide base (Kapton), it guarantees an excellent thermal insulation and good thermal performances.	Beige	6 / 0.15	90	1.3	0.41 / 2.65	6000

Q-PAD®

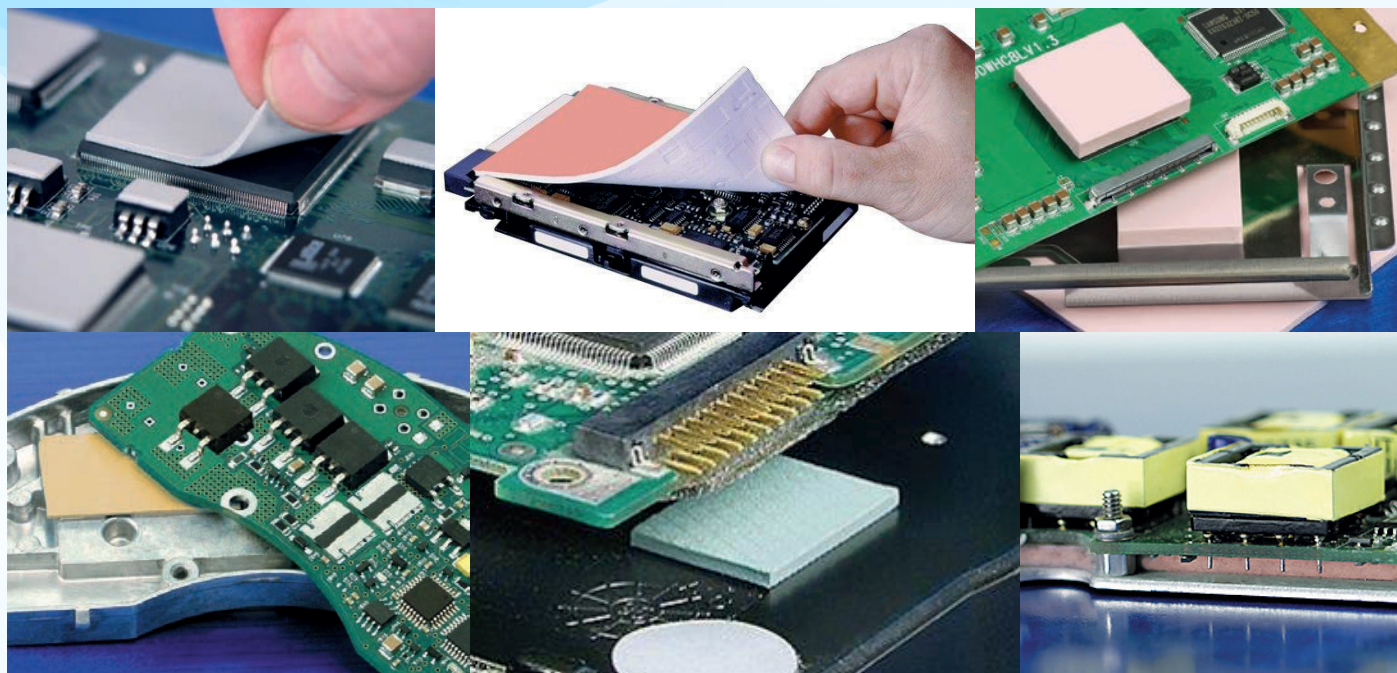
The Q-pad® series is specifically designed for all those applications in which maximum heat transfer is needed and electric insulation is not required. The Q-pad® eliminates the common problems associated to the use of thermal grease, such as contamination from soldering process, dust or dirt which can bring the overheating of components, guaranteeing an extremely speed and cleaning during the assembly process.



PRODUCT	DESCRIPTION	Color	Thickness (mils/mm)	Hardness (Shore A) ASTM D2240	Thermal Conductivity (W/m*K) ASTM D5470	Thermal Impedance @ 50psi/[3.5 Kg/cm²] (°C*in²/W) (°C*cm²/W) ASTM D5470	Dielectric Breakdown Voltage (V AC) ASTM D149
Q-pad 2 (TSP Q2500)	Pad with aluminum foil support to guarantee the maximum thermal exchange. The ideal solution to replace the thermal grease where the electrical insulation is not required.	Black	6 / 0.15	93	2.5	0.22 / 1.42	NO
Q-pad 3 (TSP Q2000)	The thermal conductive Pad with fiberglass reinforcement. The ideal solution to replace the thermal grease where the electrical insulation is not required.	Black	5 / 0.13	86	2.0	0.35 / 2.26	NO

GAP PAD®

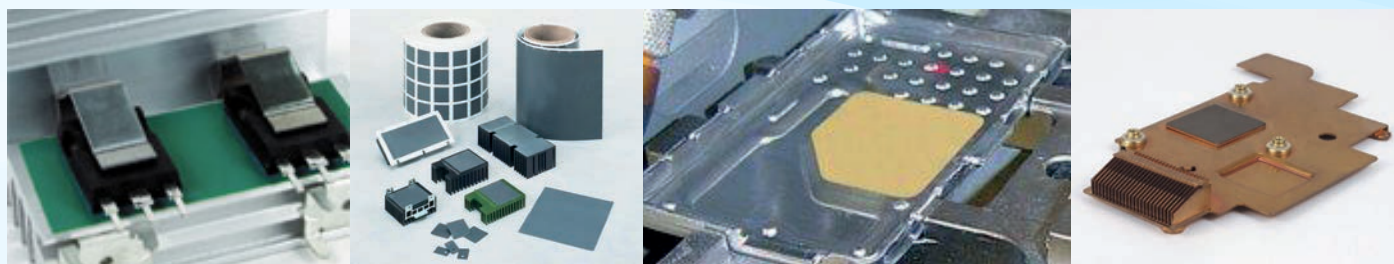
The GAP PAD® thermal interface solution is designed to offer to the electronic experts a very soft and conformable product that guarantees an excellent heat exchange between PCB/components and dissipator. With a wide range of thicknesses available, the GAP PAD® series is suitable for all the applications where a unique thermal interface with different heights on board or the recovery of assembly tolerances are required.



PRODUCT	DESCRIPTION	Color	Thickness (mils/mm)	Hardness (Shore 00) ASTM D2240	Thermal Conductivity (W/m*K) ASTM D5470	Thermal Impedance vs % strain (°C*in ² /W) (°C*cm ² /W) - ASTM D5470 (tested on 40 mils/1mm thickness)			Dielectric Breakdown Voltage (V AC) ASTM D149
Gap Pad VO Ultrasoft (TGP 1000VOUS)	"General Purpose" Gap Pad with 900S SilPad support. Naturally sticky on one side and extremely soft and conformable, it guarantees reliable and long last performances.	Pink	0.020 - 0.250 / 0.51 - 6.35	5	1.0	10%	20%	30%	6000
						1.97 / 12.7	1.87 / 12.1	1.68 / 10.8	
Gap Pad 1500 (TGP 1500)	Gap Pad un-reinforced inside and with both the surfaces naturally sticky. It maintains an excellent insulation and a marked adaptability to surfaces that generates a low final thermal resistance.	Grey	0.020 - 0.200 / 0.51 - 5.1	40	1.5	10%	20%	30%	>6000
						1.62 / 10.5	1.50 / 9.68	1.33 / 8.58	
Gap Pad HC 3.0 (TGP HC3000)	Highly conformable and fiberglass reinforced Gap Pad, ideal for low pressures assemblies. Naturally sticky on the both sides and with high thermal conductivity, it guarantees excellent thermal performances and an easy application.	Light Blue	0.010 - 0.125 / 0.25 - 3.18	15	3.0	10%	20%	30%	>5000
						0.57 / 3.68	0.49 / 3.16	0.44 / 2.84	
Gap Pad HC 5.0 (TGP HC5000)	Pad with fiberglass support that combines an excellent electrical insulation with a low thermal resistance.	Violet	0.020 - 0.125 / 0.50 - 3.18	35	5.0	10%	20%	30%	5000
						0.35 / 2.26	0.30 / 1.94	0.26 / 1.68	
Gap Pad 6000ULM (TGP 6000ULM)	Ultra-Low Modulus (ULM) Gap Pad series extremely soft and with very high thermal conductivity. Available with fiberglass reinforcement and both sticky sides, it is ideal for low pressure assemblies.	Grey	0.040 - 0.125 / 1.02 - 3.18	60 (Shore 000)	6.0	10%	20%	30%	>5000
						0.34 / 2.20	0.29 / 1.88	0.26 / 2.84	
Gap Pad 10000ULM (TGP 10000ULM)	Ultra-Low Modulus (ULM) Gap pad series extremely soft and with very high thermal conductivity. Naturally sticky on the both sides, it is ideal for minimum pressure assemblies, especially in telecom applications (5G).	Grey	0.040 - 0.125 / 1.02 - 3.18	75 (Shore 000)	10.0	10%	20%	30%	3200
						n/a	n/a	n/a	

HI-FLOW®

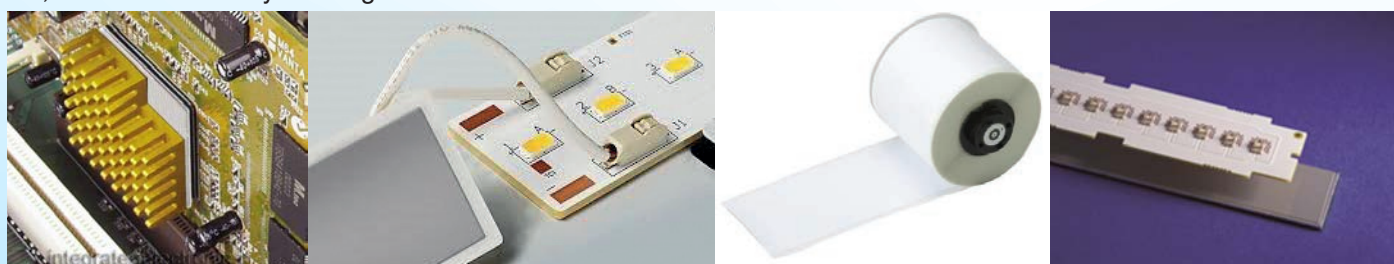
The HI-FLOW® phase change interface materials are the excellent replacement for thermal grease as an interface between the power components and the heat sink. The HI-FLOW® products are solid at room temperature, so they are easily punched on the drawing of the surface to dissipate and once they are assembled the increase of component temperature will make them similar to wax, to guarantee a total wettability of the touched surfaces. Some HI-FLOW® series products have an internal polyimide support and so they are excellent insulating as well.



PRODUCT	DESCRIPTION	Color	Thickness (mils/mm)	Total thickness (mils/mm)	Thermal Conductivity (W/m*K) ASTM D5470	Thermal Impedance @ 50psi/[3.5 Kg/cm²] (°C*in²/W) (°C*cm²/W) ASTM D5470	Dielectric Breakdown Voltage (V AC) ASTM D149
Hi-Flow 300P (THF 1600P)	Phase change material with polyimide carrier (Kapton) that ensures an excellent electrical insulation. Not adhesive product. Phase change temperature: 55°C.	Green	1 / 0.025	4 / 0.102	1.6	0.12 / 0.77	5000
			1.5 / 0.038	4.5 / 0.112		0.16 / 1.03	
			2 / 0.051	5 / 0.127		0.19 / 1.23	
Hi-Flow 650P (THF 1500P)	Phase change material with polyimide carrier (Kapton) that ensures an excellent electrical insulation. Naturally sticky on one side for difficult assemblies. Phase change temperature: 52°C.	Gold	1 / 0.025	4 / 0.102	1.5	0.19 / 1.23	5500
			1.5 / 0.038	4.5 / 0.112		0.21 / 1.35	
			2 / 0.051	5 / 0.127		0.26 / 1.68	
Hi-Flow 225F-AC (THF 1000FAC)	Phase change material applied on aluminum film to improve the thermal exchange. Sticky on one side for difficult assemblies. Phase change temperature: 55°C.	Black	1.5 / 0.038	4 / 0.102	1.0	0.09 / 0.58	NO

BOND-PLY®

The BOND-PLY® adhesive tapes are isolating material made with thermal conductive pressure sensitive adhesives and they are the ideal alternative to screws or clips to fix the components on the heat sink. Efficient already at room temperature, they don't need thermal activations. Their power fixing increases after the first thermal cycle. Available in roll, sheet or die-cut by drawing.



PRODUCT	DESCRIPTION	Color	Thickness (mils/mm)	Thermal Conductivity (W/m*K) ASTM D5470	Thermal Impedance @ 50psi/[3.5 Kg/cm²] (°C*in²/W) (°C*cm²/W) ASTM D5470	Dielectric Breakdown Voltage (V AC) ASTM D149	Continuous Use Temperature (°C)
Bond-Ply 100 (TBP 850)	Fiberglass reinforced pressure sensitive adhesive tape for permanent fixtures in industrial applications. Excellent electrical insulation and thermal exchange. Fixing increased by thermal cycles.	White	5 / 0.127	0.8	0.52 / 3.35	3000	-30 / +120
			8 / 0.203		0.78 / 5.03	6000	
			11 / 0.279		1.01 / 6.52	8500	
Bond-Ply 800 (TBP 800)	Fiberglass reinforced pressure sensitive adhesive tape for permanent fixtures. Excellent electrical insulation and thermal exchange. Ideal for lighting engineering applications.	Grey	5 / 0.127	0.8	0.60 / 3.87	4000	-40 / +125
			8 / 0.203		0.72 / 4.65	6000	

MATERIAL SUPPLYING

The materials can be supplied in sheet, roll or customized die-cut:

- SIL PAD® STANDARD SIZE SHEET= 12"x12" (305x305mm)
- GAP PAD® STANDARD SIZE SHEET= 8"x16" (203x406mm)
- GAP PAD® 10000ULM SHEET SIZE= 8"x8" (203x203mm)
- HI-FLOW® STANDARD SIZE SHEET= 10,5"x12" (267x305mm)

SIL PAD®, HI-FLOW® and BOND-PLY® are supplied in roll as well. Welt can realize different customized sizes.

The GAP PAD® materials CANNOT BE SUPPLIED IN ROLL due to their softness: the wrapping could damage the material.

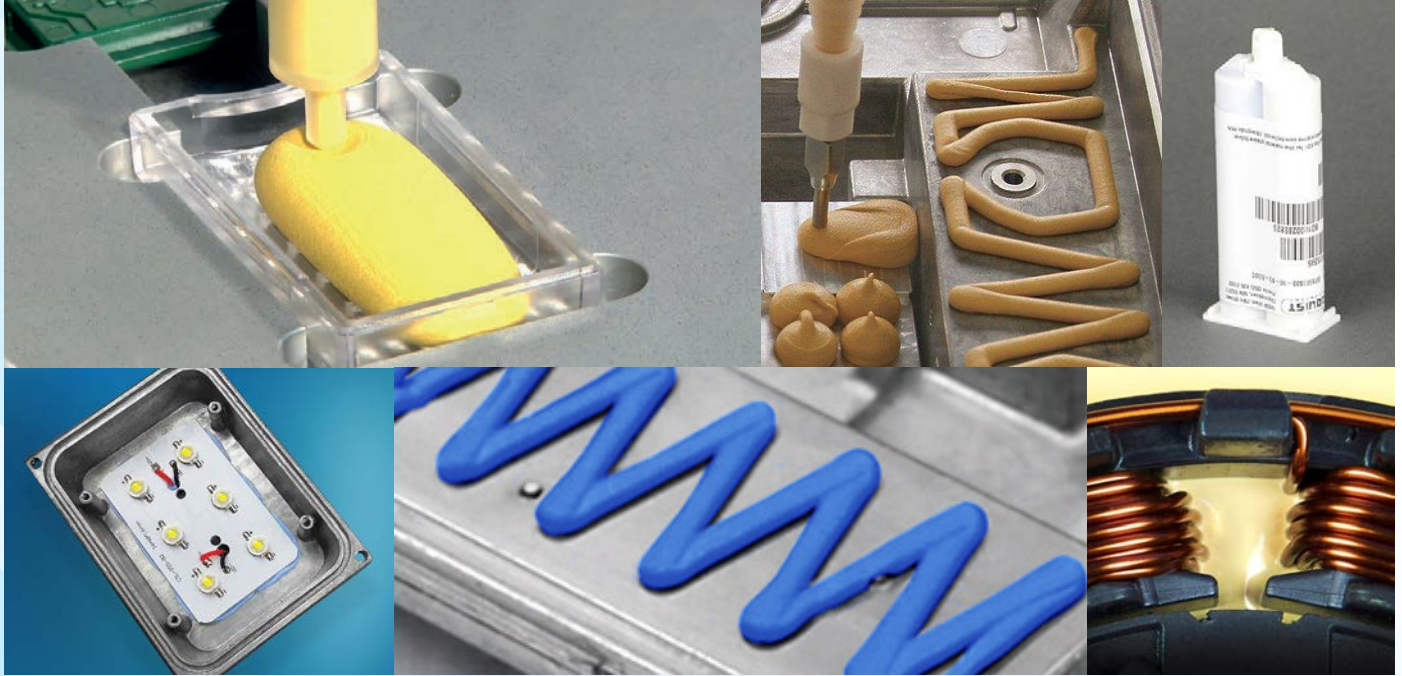
ALL THE MATERIALS CAN BE SUPPLIED IN DIE-CUT UNDER CUSTOMER'S SPECIFIC TECHNICAL REQUESTS.

TOLERANCE OF CUSTOMIZED DIE-CUT PIECES

SIL PAD® - HI-FLOW®		
PIECE SIZE	LENGTH AND WIDTH TOLERANCE (mm)	HOLES DIMENSION AND POSITION TOLERANCE (mm)
< 150x150mm	± 0,25	± 0,25
150x150mm < 300x300mm	± 0,38	± 0,38
> 300x300mm	± 0,51	± 0,51
GAP PAD®		
PIECE THICKNESS	LENGTH AND WIDTH TOLERANCE (mm)	HOLES DIMENSION AND POSITION TOLERANCE (mm)
< 0,38mm (15 mils)	± 0,38	± 0,38
0,51mm (20 mils)	± 0,51	± 0,51
1,02mm (40 mils)	± 0,89	± 0,89
1,52mm (60 mils)	± 1,27	± 1,27
2,03mm (80 mils)	± 1,27	± 1,27
2,54mm (100 mils)	± 1,52	± 1,52
3,18mm (125 mils)	± 1,91	± 1,91
4,06mm (160 mils)	± 2,54	± 2,54
5,08mm (200 mils)	± 3,17	± 3,17
6,35mm (250 mils)	± 4,06	± 4,06

GAP FILLER®

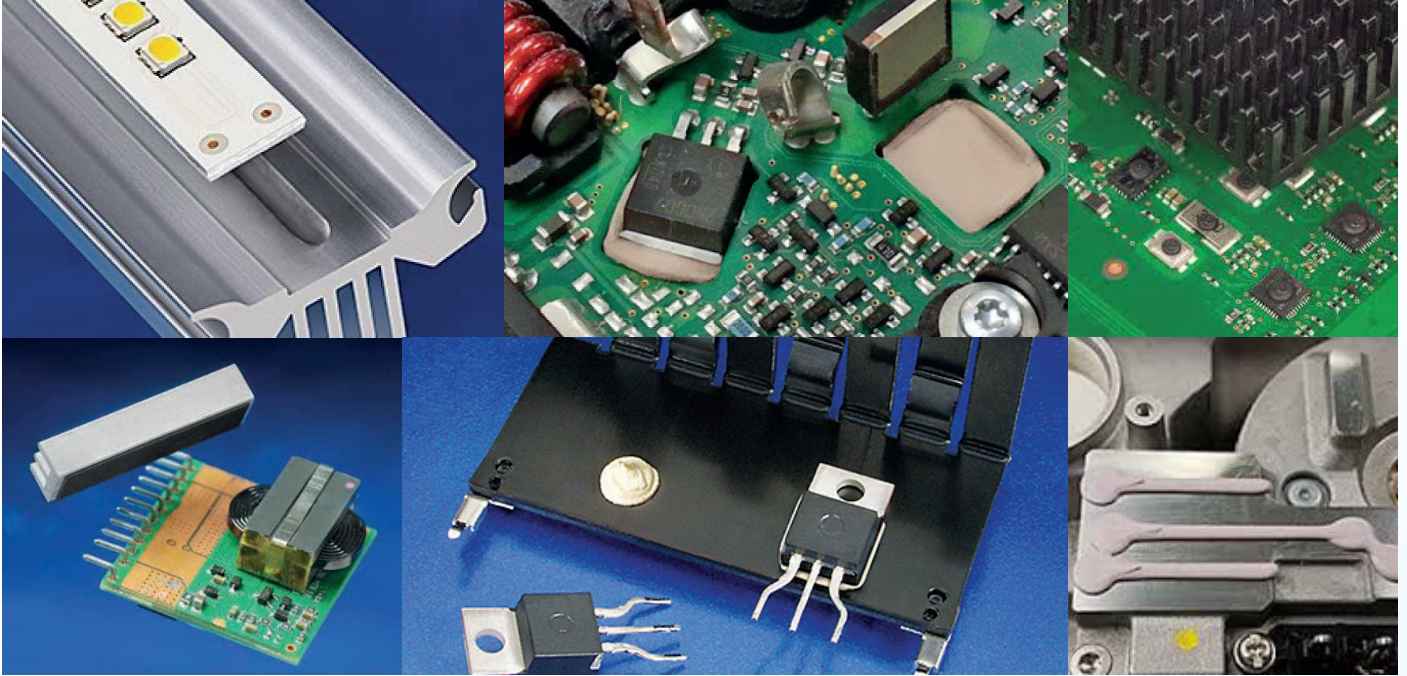
The two-part GAP FILLER® is the liquid alternative to GAP PAD®, engineered to optimize the automated dispensing in continuous cycle lines of thermal conductive insulating material. The GAP FILLER® material series remain soft even after polymerization (which takes place with different times both at room and hot temperatures), with a minimum stress on components and a maximum dissipation in intricate geometries situations or on few centimeters' thicknesses.



PRODUCT	DESCRIPTION	Color	Viscosity ASTM D2196 / D5099	Cross Linking Conditions	Hardness (Shore 00) ASTM D2240	Thermal Conductivity (W/m*K) ASTM D5470	Dielectric Break- down Voltage (V/mil) / (V/mm) ASTM D149
Gap Filler 1500 (TGF 1500)	Two-part insulating thermal conductive and high viscosity Gap Filler with excellent slump resistance. It guarantees an excellent wettability also on unpolished surfaces. It hardens at room or hot temperatures.	Yellow	25 Pa • s	5 hr @ 25°C	50	1.8	400 / 16.000
				10 min @ 100°C			
Gap Filler 1500 LV (TGF 1500LVO)	Two-part insulating thermal conductive and high viscosity Gap Filler with excellent slump resistance. Suitable for all silicone sensitive applications, it ensures an on-site level ≤100 ppm. It hardens at room or hot temperatures.	Yellow	20 Pa • s	8 hr @ 25°C	80	1.8	400 / 16.000
				10 min @ 100°C			
Gap Filler 3500S35 (TGF 3600)	Two-part insulating thermal conductive and medium-low viscosity Gap Filler. The high thermal conductivity and the final softness ensure a very efficient thermal exchange with excellent performances in the most complex assemblies.	Blue	150.000 cPs	15 hr @ 25°C	35	3.6	275 / 11.000
				30 min @ 100°C			
Gap Filler 4000 (TGF 4000)	Two-part insulating thermal conductive Gap Filler. The excellent slump resistance and wettability guarantee a better and more fixed thermal performance over time.	Blue	25 Pa • s	24 hr @ 25°C	75	4.0	450 / 18.000
				30 min @ 100°C			

LIQUI-BOND®

The thermal conductive glue LIQUI-BOND® guarantees the fastening of components on PCB to the heat sink without using screws, clips or any other mechanical support. The series includes both mono- and bi- silicone or epoxy-based components, with different indications for polymerization, which in case of silicone-based components involve a thermal cycle. Available in different types, from the manual dispenser to the automatic one for larger uses.



PRODUCT	DESCRIPTION	Color	Viscosity ASTM D2196 / D5099	Polymerization Conditions	Hardness (Shore 00) ASTM D2240	Thermal Conductivity (W/m*K) ASTM D5470	Dielectric Break- down Voltage (V/mil) / (V/mm) ASTM D149
Liqui-Bond SA1000 (TLB SA1000)	Thermal conductive one-part silicone glue with medium-low viscosity. Good thermal conductivity and electrical insulation. Hot cross linking. Application temperature between -60°C and +200°C.	Black	125.000 cPs	20 min @ 125°C	75	1.0	250 / 10.000
				10 min @ 150°C			
Liqui-Bond SA2000 (TLB SA2000)	Thermal conductive one-part silicone glue with medium viscosity. Excellent thermal conductivity, electrical insulation and fixing force. Hot cross linking. Application temperature between -60°C and +200°C.	Yellow	200.000 cPs	20 min @ 125°C	80	2.0	250 / 10.000
				10 min @ 150°C			
Liqui-Bond SA3505 (TLB SA3500)	Thermal conductive two-part silicone glue. Excellent thermal conductivity, electrical insulation and fixing force. Hot cross linking. Application temperature between -60°C and +200°C.	Brown	45 Pa * s	20 min @ 125°C	90	3.5	250 / 10.000
				10 min @ 150°C			
Liqui-Bond EA1805 (TLB EA1800)	Thermal conductive two-part and epoxy-based glue. Ideal for sensitive silicone applications in lighting market. Cross linking at room temperature. Application temperature between -40°C and +125°C.	Grey	60 Pa * s	10 hr @ 25°C	90 (Shore D)	1.8	250 / 10.000
				10 min @ 125 °C			

LOCTITE® Thermal Conductive Grease

The LOCTITE® thermal conductive grease represents a simple and fast solution to guarantee the right thermal flux from the component on board towards the dissipator. With an excellent ease of dispensing and stability even at low temperatures, the thermal conductive grease is rapidly efficient in almost all the electrical medium-power applications. Available in different types, suitable for both manual and semi-automatic dispensing.



PRODUCT	DESCRIPTION	Color	Density (g/cm ³)	Thermal Impe- dance (W/m*K) ASTM D5470	Dielectric Break- down Voltage (V/ mil) / (V/mm) ASTM D149	Preservation
TG 100	Thermal conductive silicone grease with excellent performances.	Grey	1.94	3.4	na	12 months @ 18/25°C
TC4	Thermal conductive insulating grease for high temperature applications.	White	2.35	0.6	500 / 19.000	12 months @ 18/25°C
TC8M	Thermal conductive insulating grease with excellent performances.	White	2.5	1.5	500 / 20.000	12 months @ 18/25°C

THERMAL CONDUCTIVE PRODUCTS

PAD						LIQUID		
THIN		SOFT	PHASE CHANGE MATERIALS		ADHESIVES	2K SILICONE RESINS	1K AND 2K ADHESIVES	SILICONE GREASE AND PASTE
(Sil pad®) Insulating	(Q-pad®) Not insulating	(Gap Pad®) Pad	(Hi-Flow®)		(Bond-ply®) Two-part insulating adhesives	(Gap Filler®) Insulating resins	(Liqui-bond®) Insulating glues	Loctite®
			Insulating	Not insulating				
Silpad 400 (TSP 900)	Q-pad 2 (TSP Q2500)	Gap Pad V0 Ultrasoft (TGP 1000VOUS)	Hi-Flow 300P (THF 1600P)	Hi-Flow 225F-AC (THF 1000F-AC)	Bond-Ply 100 (TBP 850)	Gap Filler 1500 (TGF 1500)	Liqui-Bond SA1000 (TLB SA1000)	TG100
Silpad 800 (TSP 1600)	Q-pad 3 (TSP Q2000)	Gap Pad 1500 (TGP 1500)	Hi-Flow 650P (THF 1500P)		Bond-Ply 800 (TBP 800)	Gap Filler 1500 LV (TGF 1500LVO)	Liqui-Bond SA2000 (TLB SA2000)	TC4
Silpad 900S (TSP 1600S)		Gap Pad HC 3.0 (TGP HC3000)				Gap Filler 3500S35 (TGF 3600)	Liqui-Bond SA3505 (TLB SA3500)	TC8M
Silpad A1500 (TSP A2000)		Gap Pad HC 5.0 (TGP HC5000)				Gap Filler 4000 (TGF 4000)	Liqui-Bond EA1805 (TLB EA1800)	
Silpad K6 (TSP K1100)		Gap Pad 6000 ULM (TGP 6000ULM)						
Silpad K10 (TSP K1300)		Gap Pad 10000 ULM (TGP 10000ULM)						

CERTIFICATIONS

All the materials are REACH and RoHS compliant.

The UL certifications are available at the following URL: <http://www.ul.com> in “Online Certification Directory” section and typing the following code: **QMFZ2.E59150**.

All the materials are AUTOMOTIVE per PPAP compliant.



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COMPANY DATA

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Social Capital: 2.000.000 i.v.
Registro Pile: IT19040P00005244