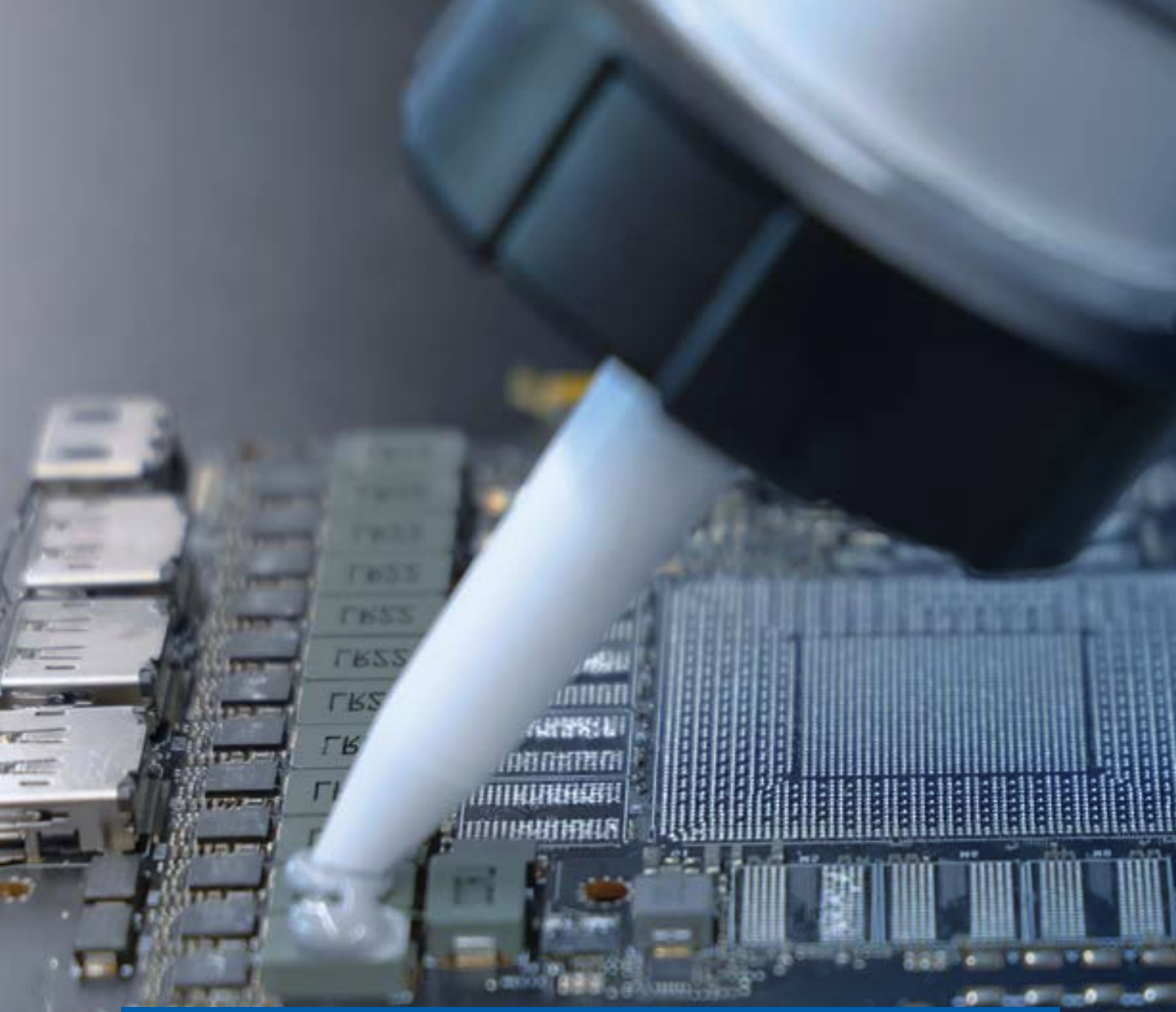
FUCHS Special Applications

FUCHS TIMs
Thermal Interface Materials

LUBRICANTS.
TECHNOLOGY.
PEOPLE.

FUCHS

MOVING YOUR WORLD



What Are Thermal Interface Materials?

FUCHS TIMs thermal interface materials are engineered to efficiently dissipate heat, ensuring reliable, safe, and optimized performance of electronic components. TIMs fill the air gap between heat-generating components, like chips or PCBs, and heat-dissipating surfaces, such as heat sinks or chassis. High thermal conductivity enables efficient heat transfer and rapid dissipation from critical hot spots, enhancing device performance and reliability. FUCHS offers a variety of thermal interface materials in various thermal conductivities, form factors and packaging options.

Unlocking the Benefits of FUCHS TIMs for Reliable Heat Transfer

Silicone-based TIMs are prone to outgassing, depositing thin insulating films that disrupt electrical contact in relays or switches by forming unwanted dielectric barriers. In automotive paint lines and semiconductor manufacturing, silicone contamination compromises adhesion, affects coating uniformity, and introduces defects during critical fabrication steps. Non-silicone materials from FUCHS don't outgass to prevent the contamination of sensitive electronic components. FUCHS TIMs offers several performance benefits including:

Excellent Thermal Conductivity

High Dielectric Strength

High Temperature Stability

Wide Compatibility

Easy Dispensing

Silicone Free

Thermal Solutions for Every Industry

FUCHS TIMs are recommended for electronic applications requiring heat dissipation in a multitude of industries including Automotive, Data Centers, Consumer Electronics, Telecommunications, Semiconductor, and Defense.

- CPU and GPU
- Data Storage Modules
- ADAS Control Systems
- Electronic Control Units
- Power Electronics
- MOSFETs, IGBT's etc.
- Consumer Electronics

ABOUT FUCHS TIMs

FUCHS – Your One Stop Provider

FUCHS is your trusted partner from design to production and beyond. Our engineers work with you to determine the optimum thermal interface material for your application. FUCHS offers a wide variety of standard packaging options as well as custom packaging options that can be tailored to your specific requirements.

To improve the efficiency of your application process, our team is available to advise you in selecting the right package, dispensing method, and equipment. As the world's largest independent lubrication supplier with a presence in more than 50 countries worldwide, FUCHS allows you to simplify your global supply chain.

1 **Test Data & Technical Support**

2 **Globally Available**

3 **Staff Training**

4 **Custom Packaging**

Which TIMs is Right for You?

Selecting the right thermal interface material is critical to ensuring optimal reliability and efficiency in your application. Here are some key factors to consider:

- **Reworkability:** Greases and putties allow easy removal; epoxies and potting compounds are permanent.
- **Mechanical:** Putty and liquid gap fillers are soft and forgiving; epoxies introduce stress on sensitive components.
- **Automation Compatibility:** All types except pads support automated dispensing; pads ideal for manual, repeatable assembly lines.
- **Contamination Sensitivity:** Non-silicone formulations preferred in electronics, optical, and cleanroom applications.

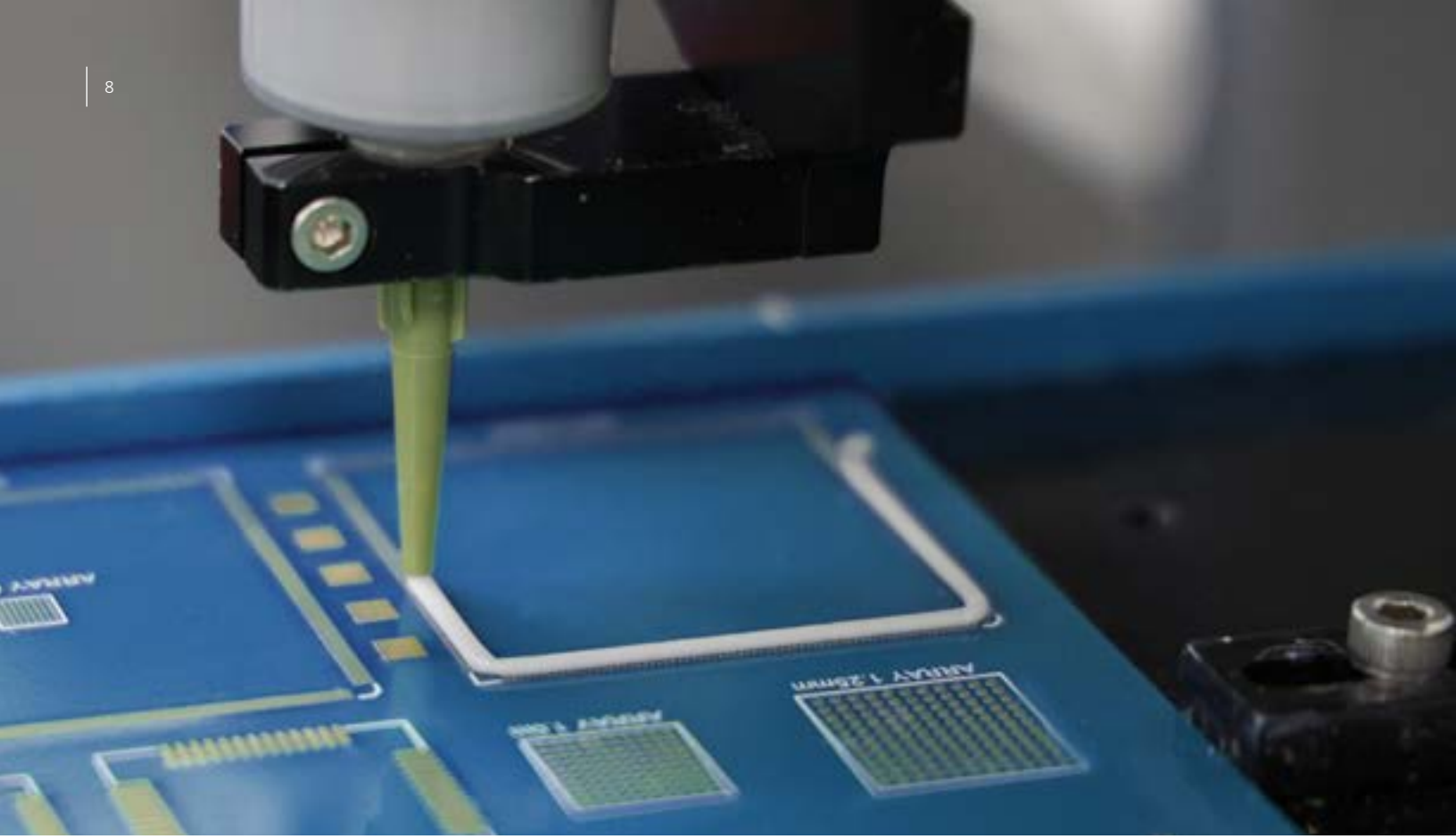
TIM Type	When to Use / Key Features	Dispensing Options	Effect on Component	Available Chemistries
Thermal Grease	High thermal conductivity, excellent surface wetting at low bond line thickness, cost-effective; extremely low thermal interfacial resistance for efficient heat transfer. Ideal for precise applications requiring reworkability.	Screen printing Automated dispensing	Minimal mechanical stress; allows reworkability	Silicone, Non-silicone, NSF food-grade
Electrically Conductive Grease	High-performance, electrically conductive grease formulated for microelectronics; maintains excellent electrical conductivity after 1000 hours at 150°C; high purity silver fillers ensure reliability in demanding environments.	Automated dispensing	Maintains electrical connection; excellent heat and signal continuity	Silver-filled, Conductive
Epoxies	Thermally conductive, electrically insulating epoxies with ceramic fillers; designed for die-to-heat sink bonding and surface-mount applications; high thermal conductivity reduces hot spots, low shrinkage minimizes stress on CTE-sensitive components. Permanent bonding. Available in one-part, two-part, heat-curable, and room-temperature cure systems.	Manual mixing Automated dispensing	Strong mechanical bond; potential stress on sensitive components; permanent, no rework	Epoxy with ceramic fillers, Non-silicone
Potting Compounds	Low-viscosity, self-leveling epoxy resins with excellent thermal conductivity and dielectric insulation. Ideal for full encapsulation; rapid heat dissipation reduces hot spots, and low-shrinkage reduces stress, protecting sensitive components.	Pour-in-place, Automated dispensing	Fully encapsulates and protects; reduces mechanical stress	Epoxy-based, Non-silicone
Pads	Thermally conductive, electrically insulating pre-cured silicone pads for clean, easy installation on assembly lines; uniform thickness ensures consistent heat dissipation and superior conformability. Ideal for production-friendly applications	Manual placement Pick-and-place automation	Minimal mechanical stress; easy application; reusable in some cases	Silicone, Non-silicone
Thermal Gels / Putties	Ultra-soft, highly conformable paste-type gap filler for sensitive components requiring minimal application pressure; conforms easily to complex shapes with minimal stress, ensuring uniform heat transfer. Available in non-silicone formulations.	Automated dispensing (cartridges to pails), Manual dispensing	Minimal mechanical stress; easily conforms to irregular shapes	Non-silicone
Liquid Gap Filler	Two-part, curable gap fillers engineered for high conformability and compressibility; suitable for variable gaps and uneven surfaces. Low modulus materials maintain mechanical stability under thermal and mechanical stress. Form-in-place application ensures effective gap coverage. Available as electrically insulating or conductive variants.	Automated metering and mixing systems	High compressibility; excellent gap coverage; maintains mechanical stability under stress	Two-part curable: Insulating or Conductive

Thermal Greases

Our **FUCHS TIM GREASE** uses thermal grease technology and provides high thermal conductivity and surface wetting capabilities at low bond line thickness. These greases have extremely low thermal interfacial resistance for efficient heat transfer. These cost-effective solutions are designed for various application techniques like screen printing and automated dispensing. Non-silicone, silicone, and NSF-approved, food-grade solutions are available.

Products from our FUCHS TIM 700 series are electrically conductive high-performance greases designed for microelectronic applications, formulated with high-purity silver and advanced resin systems. They are designed for high-temperature applications and maintain superior electrical conductivity even after 1000 hours of exposure at 150 °C, ensuring long-term performance and reliability in demanding environments.

Product	Type	Temperature Range (°C)	Color	Apparent Viscosity CTM 014 5 rpm @ 25°C (Pa·s)	Specific Gravity ASTM D792 (g/mL)	Thermal Conductivity ASTM D5470 (W/m-K)	Breakdown Voltage ASTM D149 (KV/mm)	Volume Resistivity ASTM D257 (Ohm-cm)	Description
FUCHS TIM GREASE 4060	Non-Silicone	-55 to 200	Grey	450	2.4	6	2.8	10^{9}	Screen printable grease.
FUCHS TIM GREASE 611HTC	Non-Silicone	-55 to 360	Grey	150	3.2	3.2	3	10^{10}	Grease with high temperature stability.
FUCHS TIM GREASE 618	Non-Silicone	-55 to 360	Grey	60	2.3	1.2	16	10^{14}	Low outgassing grease with high temperature stability.
FUCHS TIM GREASE 710NS	Non-Silicone	-55 to 200	Silver	500	4	7	N/A	$<10^{2}$	Highly electrically & thermally conductive paste recommended for EMI & electrical contacts/ grounding.
FUCHS TIM EJC 745SL	Silicone	-55 to 200	Grey	Pent 250-300	_	1	N/A	_	Very tacky, thermally conductive grease that prevents oxidation & resists corrosion.
FUCHS TIM GREASE 510	Silicone	-55 to 200	White	150	2.2	0.8	15	10^{14}	Screen printable, food grade grease with NSF approval & low bond line thickness.



Epoxies

FUCHS TIM EPOXY from the FUCHS TIM-800 series are thermally conductive, electrically insulating epoxies engineered with highly conductive ceramic fillers and non-silicone resins. These materials are engineered to meet the challenging requirements of die-to-heat sink bonding, and surface-mount applications. Their high thermal conductivity mitigates localized hot spots, while the low epoxy shrinkage minimizes mechanical stress on CTE (Co-efficient of thermal expansion) sensitive components, thereby improving thermal management and improving operational efficiency. Available in one part, two parts, heat curable, and room temperature cure systems.

Product	Type	Temperature Range (°C)	Color	Mixed Viscosity CTM 014 5 rpm @ 25°C (Pa·s)	Specific Gravity ASTM D792 (g/mL)	Thermal Conductivity ASTM D5470 (W/m-K)	Breakdown Voltage ASTM D149 (KV/mm)	Volume Resistivity ASTM D257 (Ohm-cm)	Description
FUCHS TIM EPOXY 816HTC	Heat Cure	-55 to 200	Grey	80-120	1.7	2.7	16	10^{11}	Two part epoxy with RT cure, high thermal conductivity, and high bond strength.

Thermal Gels / Putties

FUCHS TIM PUTTY is a one-part, ultra-soft, highly conformable paste-type gap filler designed to ensure efficient heat transfer between sensitive components where minimal pressure can be applied. Its soft consistency allows for uniform application across varying thicknesses with lower stress tolerance. This form-in-place gap filler addresses the thermal management challenges of integrating high-frequency electronics into compact devices. They easily conform to and adhere to most surfaces, shapes, and sizes with minimal compression force. Non-silicone formulations are available for applications where silicone contamination could impact sensitive devices. They are designed for automated dispensing and compatible with packaging configurations ranging from 30 cc cartridges to 5-gallon pails.

Product	Type	Temperature Range (°C)	Color	Apparent Viscosity CTM 014 5 rpm @ 25°C (Pa·s)	Specific Gravity ASTM D792 (g/mL)	Thermal Conductivity ASTM D5470 (W/m-K)	Breakdown Voltage ASTM D149 (KV/mm)	Volume Resistivity ASTM D257 (Ohm-cm)	Description
FUCHS TIM PUTTY 3W	Non-Silicone	-40 to 150	White	4,500	2.7	3.5	16	10^{14}	One part, tacky putty recommended for vertical applications.
FUCHS TIM PUTTY 51W	Non-Silicone	-40 to 150	Grey	5,000	2.3	5.1	3.2	10^{9}	One part putty with rapid heat transfer and zero stress to components.
FUCHS TIM PUTTY 6W	Non-Silicone	-40 to 150	Grey	7,000	2.3	6	3.2	10^{9}	One part putty with rapid heat transfer and zero stress to components.

Liquid Gap Fillers

FUCHS TIM LGF liquid gap fillers are two-part, curable thermal interface materials engineered for high-performance thermal management. They feature a low modulus and high compressibility for excellent conformability, ensuring reliable mechanical stability under elevated thermal and mechanical stress conditions. These materials are available in thermally conductive, electrically insulating or conductive variants with room or elevated temperature cure profiles. As form-in-place materials, they accommodate devices with variable gaps, offering high stack-up tolerance for reliable thermal interface coverage.

Product	Type	Temperature Range (°C)	Color	Mixed Viscosity 5 rpm @ 25°C (Pa·s)	Specific Gravity ASTM D792 (g/mL)	Thermal Conductivity ASTM D5470 (W/m-K)	Breakdown Voltage ASTM D149 (KV/mm)	Volume Resistivity ASTM D257 (Ohm-cm)	Description
FUCHS TIM LGF 2030	Silicone	-55 to 200	Blue	400*	2.5	3.5	13	10^{12}	Two part liquid gap filler with low hardness and RT cure.
FUCHS TIM LGF 2021NS	Non-Silicone	-55 to 150	Green	_	2.7	2.1	12	10^{12}	Two part liquid gap filler with low hardness and tacky cure.

Potting Compounds

Products from the **FUCHS TIM PC** are low viscosity, self-leveling, flowable epoxy filled resin systems, engineered for superior thermal conductivity and high dielectric insulation. These compounds facilitate rapid heat dissipation, effectively mitigating hot spots and optimizing the thermal performance of encapsulated devices. The low-shrinkage formulation reduces mechanical stress, minimizing the risk of damage to sensitive components.

Product	Type	Temperature Range (°C)	Color	Mixed Viscosity 5 rpm @ 25°C (Pa·s)	Specific Gravity ASTM D792 (g/mL)	Thermal Conductivity ASTM D5470 (W/m-K)	Breakdown Voltage ASTM D149 (KV/mm)	Volume Resistivity ASTM D257 (Ohm-cm)	Description
FUCHS TIM PC 8550TC	Silicone	-55 to 200	Grey	4	2.15	1.2	18	10^{15}	Two part re-workable potting compound with soft and flexible cure.
FUCHS TIM PC 8850FT	Non-Silicone	-55 to 150	Black	50	2.35	1.6	18	10^{15}	Two part hard cure potting compound with long service life.

Gap Pads

Our **FUCHS TIM PAD** products are thermally conductive, electrically insulating silicone pads that are engineered for clean, production-friendly applications. These pre-cured sheets are designed to deliver efficient thermal management by providing high thermal conductivity, robust electrical insulation, and superior conformability for improved interface sealing. Available in both silicone and non-silicone formulations, they address the industry's demand for high-performance thermal interface materials that ensure reliable and consistent heat dissipation.

Product	Type	Temperature Range	Color	Apparent Viscosity CTM 014 5 rpm @ 25°C (Pa·s)	Specific Gravity ASTM D792 (g/mL)	Thermal Conductivity ASTM D5470 (W/m-K)	Breakdown Voltage ASTM D149 (KV/mm)	Volume Resistivity ASTM D257 (Ohm-cm)	Description
FUCHS TIM PAD 1106	Silicone	-55 to 200	Red	N/A	_	6	14	10^{11}	Pad with high thermal conductivity.
FUCHS TIM PAD HTC-16	Silicone	-55 to 200	Grey	N/A	_	16	10	10^{11}	Pad for very high heat flux applications requiring rapid heat transfer.

MOVING YOUR WORLD

by cooling smarter, performing stronger.

LUBRICANTS.
TECHNOLOGY.
PEOPLE.

FUCHS

FUCHS Lubricants

Innovative lubricants need experienced application engineers

Every lubricant change should be preceded by expert consultation on the application in question. Only then the best lubricant system can be selected. Experienced FUCHS engineers will be glad to advise on products for the application in question and also on our full range of lubricants.

FUCHS LUBRICANTS CO.
17050 Lathrop Avenue
Harvey, IL 60426
United States
Phone +1 708-333-8900
E-mail inquiry@fuchs.com
www.fuchs.com/us