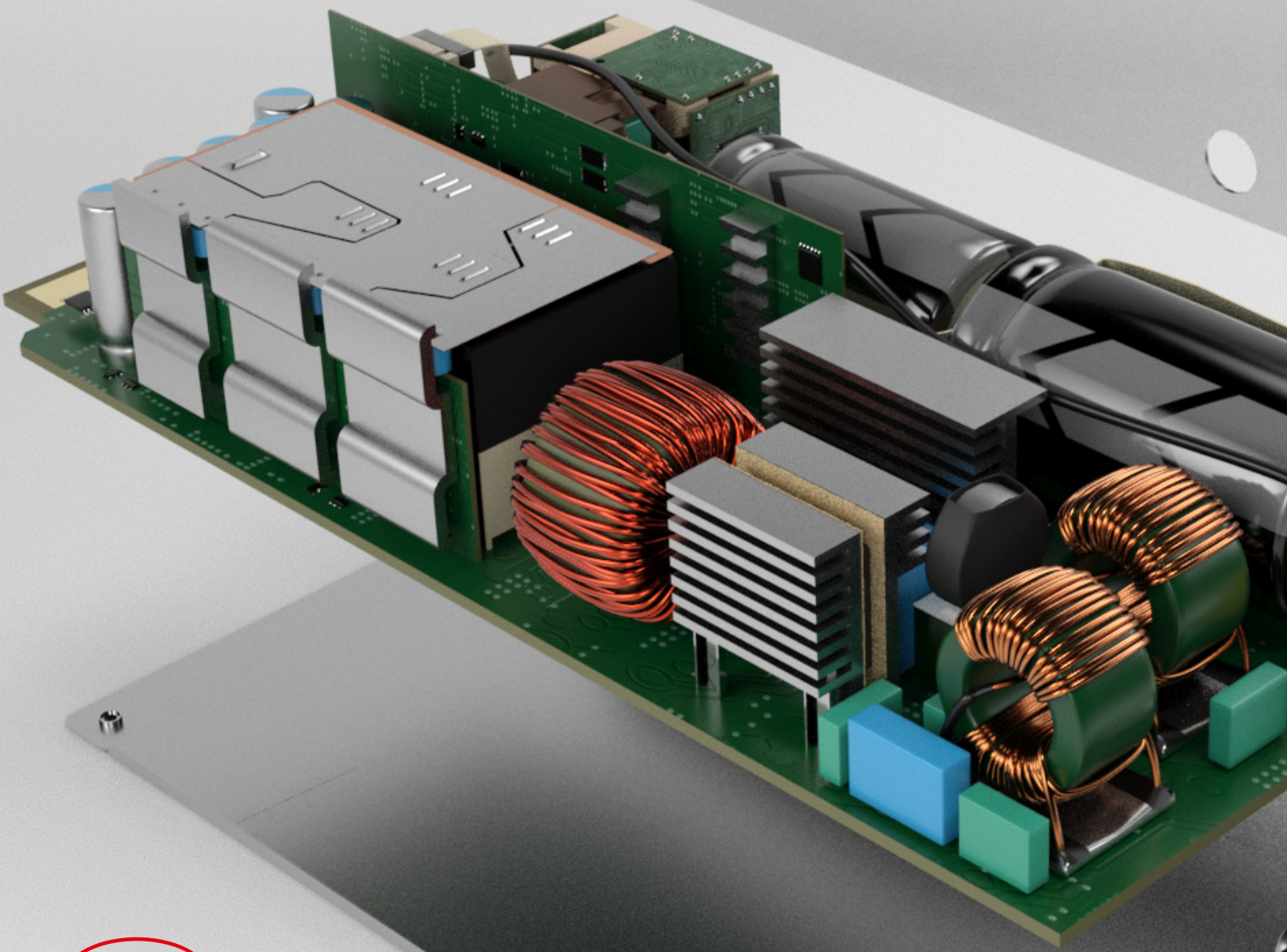
LOCTITE®
TECHNOMELT®

BERGQUIST®

MATERIAL SOLUTIONS FOR
POWER SUPPLIES AND CONVERTERS

Formulated for Continuous Performance and Sustainable Results



Henkel

Henkel Adhesive Technologies

CONTENTS

03 INTRODUCTION TO POWER SUPPLIES

04 AC/DC MATERIAL SOLUTIONS

05 DC/DC MATERIAL SOLUTIONS

06 THERMAL MATERIALS

13 PROTECTING MATERIALS

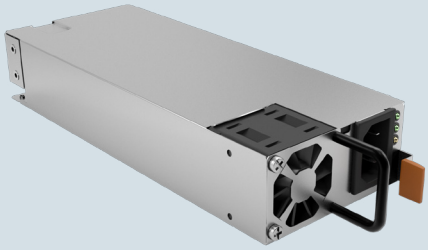
17 BONDING MATERIALS

INTRODUCTION TO POWER SUPPLIES

The demands on power supplies in industrial electronics are immense. Expectations for higher power and increased functionality within smaller dimensions – without impacting reliability or raising cost – are driving manufacturers toward more capable materials and processes. As a global partner with proven product performance, Henkel's family of electronic materials helps designers achieve these ambitions.

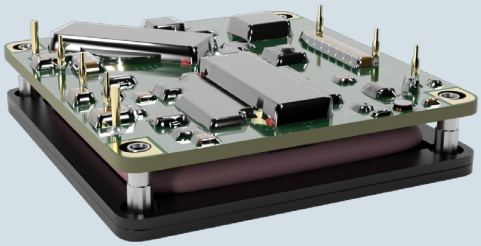
AC/DC Power Conversion

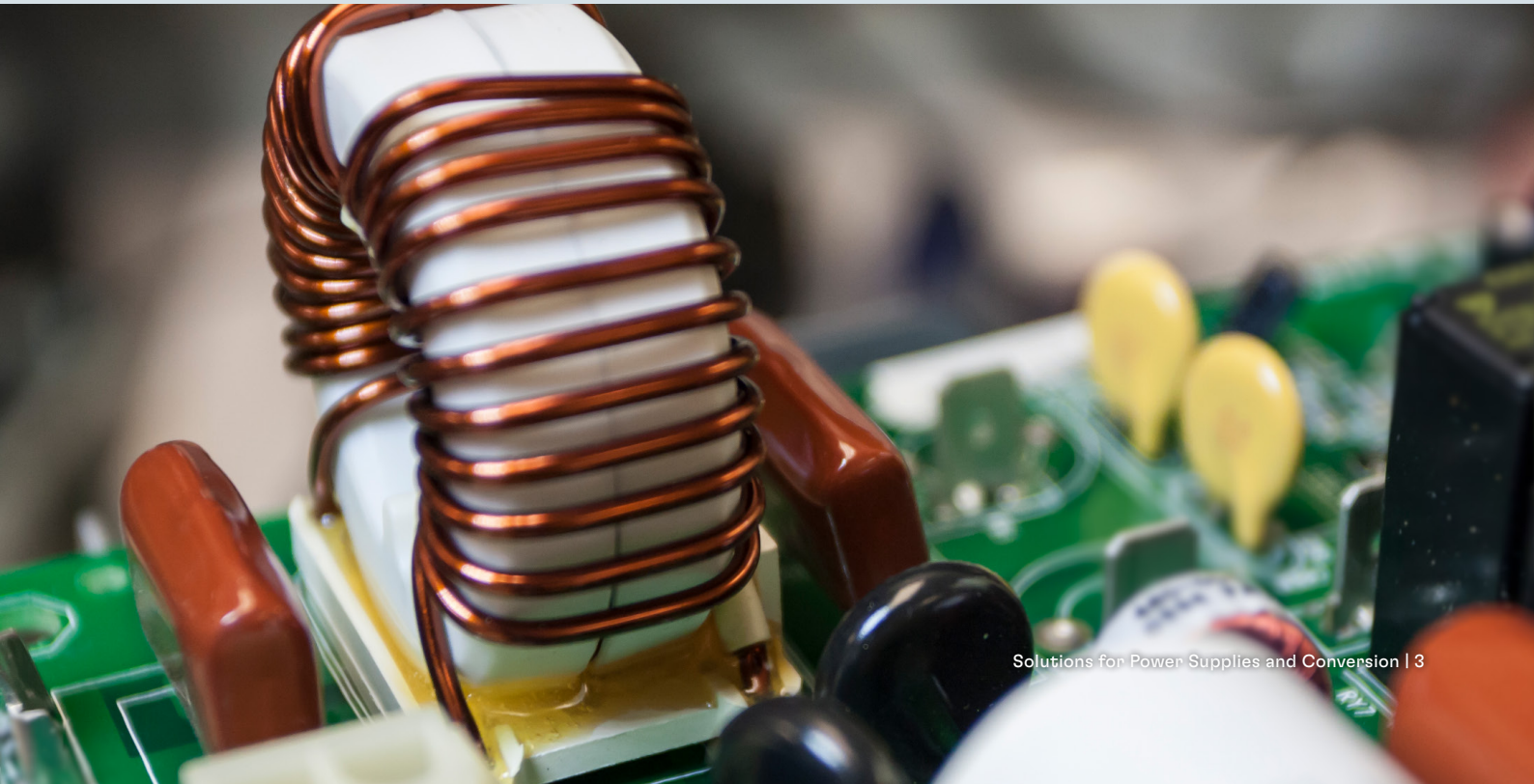
AC/DC power supplies are designed to convert AC distribution power to DC power for use by end applications, distribution systems and alternative energy devices. Improvements in design and capability facilitated by novel electronic materials allow these important electronic systems to be smaller, more portable, increasingly powerful, and highly reliable. Henkel materials play a critical role in producing
AC/DC power supplies so that electrical connections are secure, structures are durable and function is dependable.



DC/DC Power Conversion

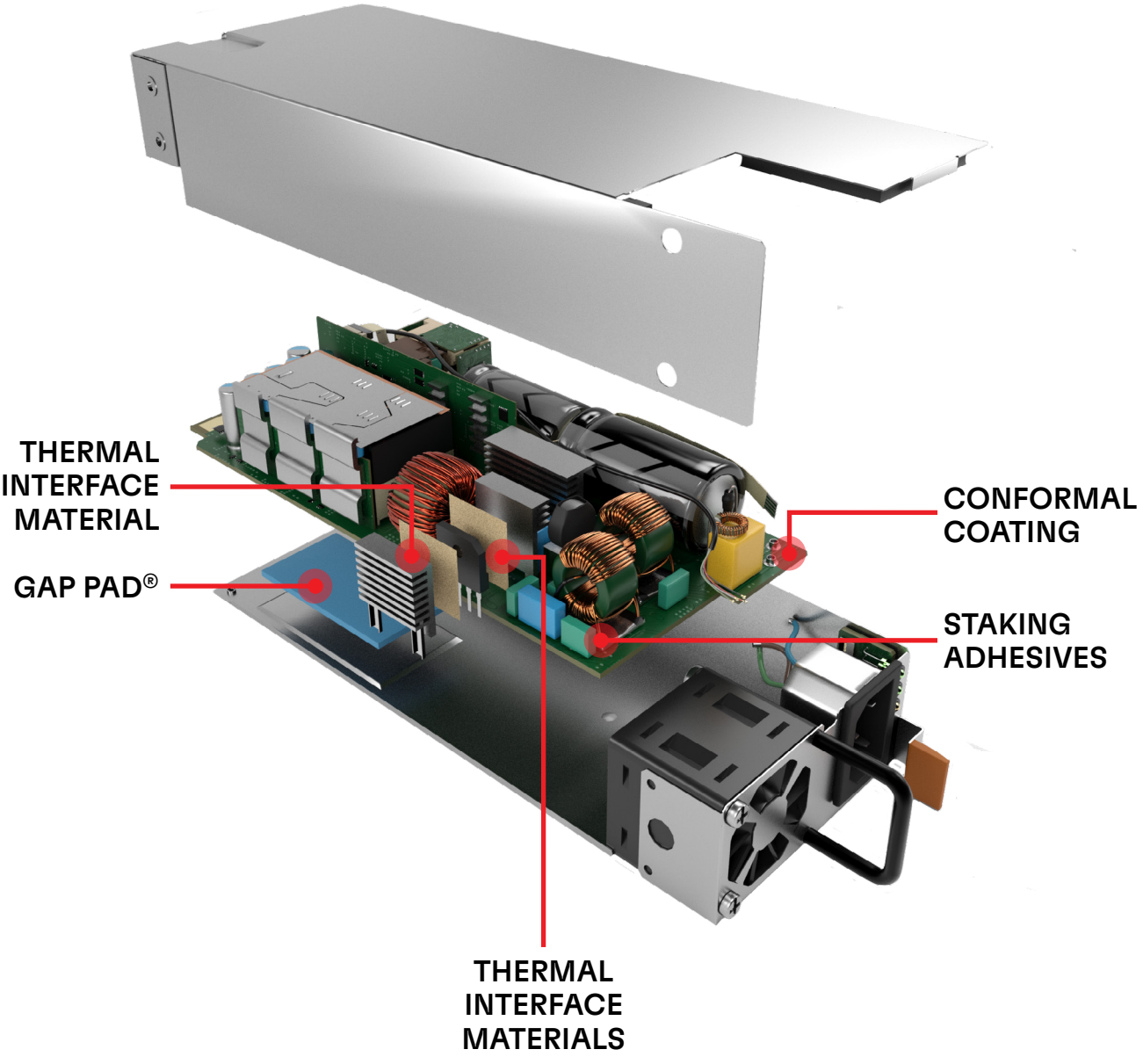
Utilized to enable efficient distribution of power through electronic systems, DC/DC power converters are under constant pressure to handle more watts per cubic centimeter, run more efficiently and maintain high reliability standards. With Henkel materials as a central component to achieving these ambitions, DC/DC
converters can be designed and manufactured with increased power densities and higher reliability at reduced cost.





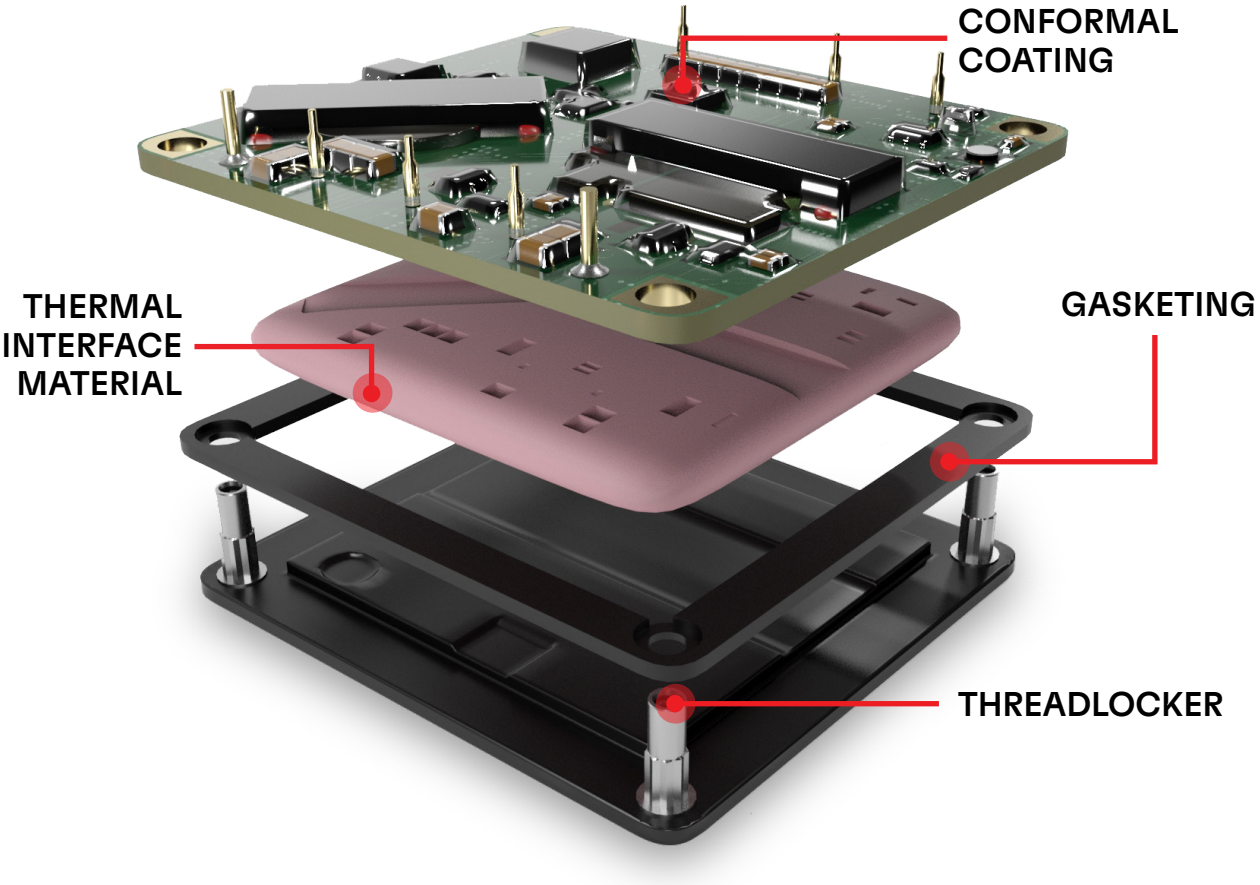
MATERIAL SOLUTIONS

FOR AC/DC POWER DEVICE



MATERIAL SOLUTIONS

FOR DC/DC POWER DEVICE



A TOTAL SOLUTIONS APPROACH

THERMAL MANAGEMENT

Henkel's portfolio of products for power conversion technology offers a holistic approach through compatible material sets that simplify the supply chain with a single, low-risk source for thermal, connecting, protecting and bonding solutions.

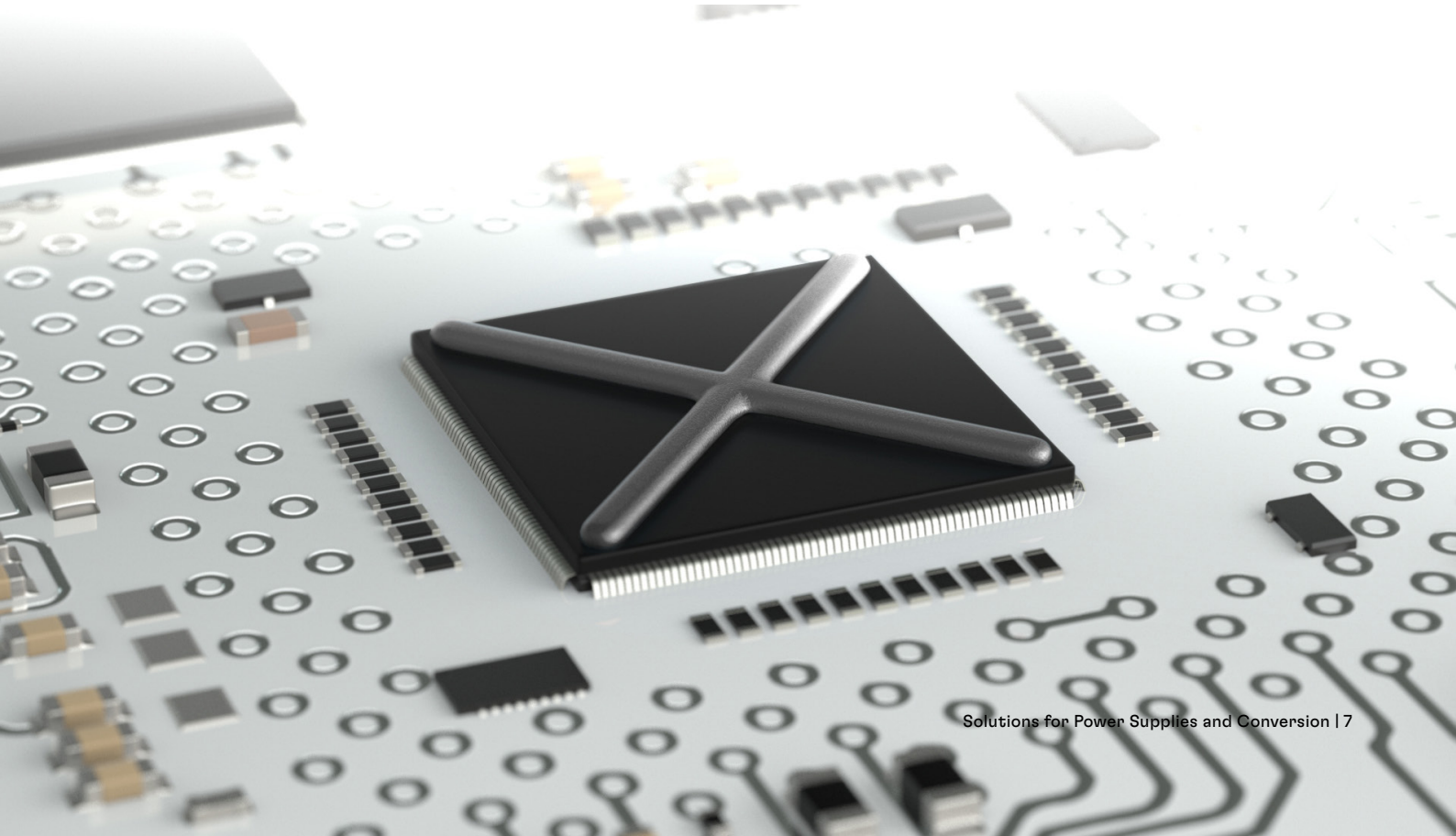
Managing the thermal load produced by expanded function with smaller dimensions is challenging all electronic sectors, including the power supply market. As power densities increase and reliability expectations rise, Henkel's BERGQUIST® brand of thermal interface materials (TIMs) provide safety agency recognition and low thermal resistance dielectric interfaces between power-generating components and heat sinks. A wide range of TIMs in pad, liquid and phase change formulations are available in a variety of chemistry platforms and thermal conductivities to suit almost any AC/DC or DC/DC power converter requirement.

THERMAL MATERIALS FOR AC/DC

PHASE CHANGE	BOND PLY	GAP FILLER	GAP PAD®	SIL PAD®	
BERGQUIST® SIL PAD® TSP 1600S	BERGQUIST® BOND PLY TBP 1400 LMS-HD	BERGQUIST® GAP FILLER TGF 1500LVO	BERGQUIST® GAP PAD® TGP 1000VOUS	BERGQUIST® SIL PAD® TSP 1600	BERGQUIST® SIL PAD® TSP Q2000
LOCTITE® TCP 4000PM		BERGQUIST® GAP FILLER TGF 1500LVO	BERGQUIST® GAP PAD® TGP HC3000	BERGQUIST® SIL PAD® TSP 1600S	BERGQUIST® SIL PAD® TSP Q2500
BERGQUIST® HI FLOW THF 1500P		BERGQUIST® GAP FILLER TGF 3600	BERGQUIST® GAP PAD® TGP HC5000	BERGQUIST® SIL PAD® TSP K1800ST	
BERGQUIST® HI FLOW THF 1600P		BERGQUIST® GAP FILLER TGF 3500LVO	BERGQUIST® GAP PAD® TGP 6000ULM	BERGQUIST® SIL PAD® TSP K900	
		BERGQUIST® GAP FILLER TGF 4500CVO	BERGQUIST® GAP PAD® TGP 7000ULM	BERGQUIST® SIL PAD® TSP K1100	
		BERGQUIST® GAP FILLER TGF 3000SF		BERGQUIST® SIL PAD® TSP K1300	

THERMAL INTERFACE MATERIALS FOR DC/DC

SIL PAD®		GAP PAD®	GAP FILLER	LIQUI FORM	LIQUI BOND
BERGQUIST® SIL PAD® TSP 1600S	BERGQUIST® SIL PAD® TSP K1100	BERGQUIST® GAP PAD® TGP 1350	BERGQUIST® GAP FILLER TGF 1500	BERGQUIST® LIQUI FORM TLF LF3500	BERGQUIST® LIQUI BOND TLB EA1800
BERGQUIST® SIL PAD® TSP 1800ST	BERGQUIST® SIL PAD® TSP K1300	BERGQUIST® GAP PAD® TGP 1000VOUS	BERGQUIST® GAP FILLER TGF 1500LVO		BERGQUIST® LIQUI BOND TLB SA2000
BERGQUIST® SIL PAD® TSP K900		BERGQUIST® GAP PAD® TGP HC3000			BERGQUIST® LIQUI BOND TLB SA2005RT
		BERGQUIST® GAP PAD® TGP HC5000			
		BERGQUIST® GAP PAD® TGP 6000ULM			
		BERGQUIST® GAP PAD® TGP 7000ULM			



THERMAL INTERFACE MATERIALS – SIL PAD®

Product Name	Description	Key Attributes	Thermal Conductivity (W/m•K)	Hardness	Dielectric Breakdown Voltage	Thickness (mm)	Flammability Rating
BERGQUIST® SIL PAD® TSP 1600	A highly compliant pad that provides high thermal performance and electrical isolation at low mounting pressures	▪ Thermal impedance: 0.45°C-in² /W (at 50 psi) ▪ High value material ▪ Smooth and highly compliant surface ▪ Electrically isolating	1.6	90 (ShoreA)	3,000	0.127	UL 94 V-0
BERGQUIST® SIL PAD® TSP 1600S	A thermally conductive insulation material that provides high thermal performance and electrical isolation at low mounting pressures	▪ Thermal impedance: 0.61°C-in²/W (at 50 psi) ▪ Electrically isolating ▪ Low mounting pressures ▪ Smooth and highly compliant surface ▪ General-purpose thermal interface material solution	1.6	92 (Shore A)	5,500	0.229	UL 94 V-0
BERGQUIST® SIL PAD® TSP 1800ST	A fiberglass-reinforced material that is tacky on both sides for high volume assemblies	▪ Thermal impedance: 0.23°C-in²/W (at 50 psi) ▪ Naturally tacky on both sides ▪ Pad is repositionable ▪ Excellent thermal performance ▪ Auto-placement and dispensible	1.8	75 (Shore 00)	3,000	0.203	UL 94 V-0
BERGQUIST® SIL PAD® TSP K900	A specially developed film that withstands high voltages and requires no thermal grease	▪ Thermal impedance: 0.48°C-in² /W (at 50 psi) ▪ Withstands high voltages ▪ High dielectric strength ▪ Very durable	0.9	90 (Shore 00)	6,000	0.152	UL 94 VTM-0
BERGQUIST® SIL PAD® TSP K1100	A medium performance film coated with silicone elastomer to provide a strong dielectric barrier	▪ Thermal impedance: 0.49°C-in² /W (at 50 psi) ▪ Physically strong dielectric barrier against cut-through ▪ Medium performance film	1.1	90 (Shore 00)	6,000	0.152	UL 94 VTM-0
BERGQUIST® SIL PAD® TSP K1300	A high performance insulator to replace ceramic insulators such as Beryllium Oxide, Boron Nitride, and Alumina	▪ Thermal impedance: 0.41°C-in² /W (at 50 psi) ▪ Tough dielectric barrier against cut-through ▪ High performance film ▪ Designed to replace ceramic insulators	1.3	90 (Shore 00)	6,000	0.152	UL 94 VTM-0
BERGQUIST® SIL PAD® TSP Q2000	A fiberglass-reinforced grease replacement that withstands processing stresses without losing physical integrity and provides ease of handling during application	▪ Thermal impedance: 0.35°C-in²/W (at 50 psi) ▪ Eliminates processing constraints typically associated with grease ▪ Conforms to surface textures ▪ Easy handling ▪ May be installed prior to soldering and cleaning without worry	2.0	86 (Shore A)	Non-Insulating	0.127	UL 94 V-0
BERGQUIST® SIL PAD® TSP Q2500	Aluminum foil coated on both sides with thermally/electrically conductive rubber for applications needing maximum heat transfer but not requiring electrical isolation	▪ Thermal impedance: 0.22°C-in²/W (at 50 psi) ▪ Maximum heat transfer ▪ Aluminum foil coated both sides ▪ Designed to replace thermal grease	2.5	93 (Shore A)	Non-Insulating	0.152	UL 94 V-0

GAP PAD®

Product Name	Description	Key Attributes	Thermal Conductivity (W/m•K)	Modulus at 25°C (kPa)	Dielectric Breakdown Voltage	Thickness (mm)	Flammability Rating
BERGQUIST® GAP PAD® TGP 1350	Highly compliant gap pad material	• Permanent liner reinforcement allows easy rework and resistance to puncture and tear resistance • Highly conformable/low hardness • Designed for and low-stress applications	1.3	110	6,000 V at 500 µm	0.508 – 3.175	UL 94 V-0
BERGQUIST® GAP PAD® TGP 1000VOUS	Thermally conductive gap filling material	• Highly conformable, low hardness • "Gel-like" modulus • Decreased strain • Puncture, shear and tear resistant • Electrically isolating	1.0	55	6,000 V at 500 µm	0.508 – 6.350	UL 94 V-0
BERGQUIST® GAP PAD® TGP HC3000	Thermally conductive gap filling material	• High-compliance, low compression stress • Fiberglass reinforced for shear and tear resistance • Low modulus	3.0	110	5,000 V at 500 µm	0.508 – 3.175	UL 94 V-0
BERGQUIST® GAP PAD® TGP HC5000	Thermally conductive gap filling material	• Highly conformable • Exceptional thermal performance • High-compliance, low compression stress • Fiberglass reinforced for shear and tear resistance • Low modulus	5.0	121	5,000 V at 500 µm	0.508 – 3.175	UL 94 V-0
BERGQUIST® GAP PAD® TGP 6000ULM	A high performance thermally conductive gap filling material with ultra low modulus	• Thermally conductive: 6.0 W/m·K • High-compliance, low compression stress • Ultra low modulus	6.0	41	5,000 V at 500 µm	1.524 – 3.175	UL 94 V-0
BERGQUIST® GAP PAD® TGP 7000ULM	A high performance thermally conductive gap filling material with ultra low modulus	• Thermally conductive: 7.0 W/m·K • Highly conformable, extremely low compression stress • Conforms and maintains structured integrity with minimum stress applied	7.0	28	5,000 V at 500 µm	1.016 – 3.175	UL 94 V-0

GAP FILLER

Product Name	Description	Key Attributes	Thermal Conductivity (W/m•K)	Viscosity at 25°C (cP)	Dielectric Strength (V/25 µm)	Recommended Cure	Flammability Rating
BERGQUIST® GAP FILLER TGF 1500	Two-part, high performance, thermally conductive liquid gap filling material	• Optimized shear thinning characteristics for ease of dispensing • Excellent slump resistance (stays in place) • Ultra-conforming with excellent wet-out for low stress interface applications • 100% solids – no cure by-products • Excellent low and high temperature mechanical and chemical stability	1.8	250,000	400	5 hr. at 25°C	UL 94 V-0
BERGQUIST® GAP FILLER TGF 1500LVO	Thermally conductive gap filling material	• Thermal conductivity: 1.8 W/m·K • Low volatility for silicone sensitive applications • Ultra-conforming, with excellent wet-out • 100% solids — no cure by-products • Excellent low and high temperature mechanical and chemical stability	1.8	20,000	400	8 hr. at 25°C	UL 94 V-0

THERMAL INTERFACE MATERIALS – GAP FILLER – CONTINUED

Product Name	Description	Key Attributes	Thermal Conductivity (W/m•K)	Viscosity	Dielectric Strength (V/25 µm)	Recommended Cure	Flammability Rating
BERGQUIST® GAP FILLER TGF 3600	Thermally conductive liquid gap filling material	▪ High thermal performance ▪ Thixotropic nature makes it easy to dispense ▪ Ultra-conforming material designed for fragile and low-stress applications ▪ Ambient or accelerated cure schedules	3.6	150,000 at 25°C (cP)	275	15 hr. at 25°C	UL 94 V-0
BERGQUIST® GAP FILLER TGF 3500LVO	Thermally conductive, low outgassing liquid gap filling material	▪ Low volatility for outgassing sensitive applications ▪ Ultra-conforming with excellent wet-out for low stress interfaces on applications ▪ 100% solids - no cure by-products ▪ Ambient or accelerated cure schedules	3.5	45,000 at 25°C (cP)	275	24 hr. at 25°C	UL 94 V-0
BERGQUIST® GAP FILLER TGF 4000	Two-part, high performance, thermally conductive, liquid gap filling material	▪ Thermal Conductivity: 4.0 W/m·K ▪ Extended working time for manufacturing flexibility ▪ Ultra-conforming with excellent wet-out ▪ 100% solids - no cure by-products ▪ Excellent low and high temperature chemical and mechanical stability	4.0	50,000 at 25°C (cP)	450	24 hr. at 25°C	UL 94 V-0
BERGQUIST® GAP FILLER TGF 4500CVO	Two-part, high performance, thermally conductive, liquid gap filling material	▪ Thermal conductivity: 4.5 W/m·K ▪ Extended working time for manufacturing flexibility ▪ Controlled Volatile Silicones ▪ High dispense throughput ▪ Optimized viscosity for automated dispensing processes	4.5	20,000	–	48 hr. at 25°C	UL 94 V-0
BERGQUIST® GAP FILLER TGF 3000SF	Two-part room temperature curable gap filler suitable for use in high throughput assembly applications	▪ Thermal Conductivity: 3.0 W/m·K ▪ Dispensable liquid, 2K Silicone free Gap Filler ▪ Room temperature cure - no oven required ▪ Extremely high dispense rate: Equipment dependent ▪ Low compression stress during assembly	3.0	22,000	–	72 hr. at 25°C 3 hr. at 85°C	UL 94 V-0

LIQUI-FORM

Product Name	Description	Key Attributes	Thermal Conductivity (W/m•K)	Volume Resistivity (Ω-m)	Dielectric Strength (V/25 µm)	Dispense Rate (grams/min.)	Flammability Rating
BERGQUIST® LIQUI-FORM TLF LF3500	A one-part, highly conformable thermally conductive gel with thixotropic properties	▪ Thermal Conductivity: 3.5 W/m·K ▪ Dispensable pre-cured gel ▪ Stable viscosity in ▪ storage and in the application ▪ Excellent chemical stability and mechanical stability	3.5	1×10^{11}	250	40	UL94 V-0

THERMAL INTERFACE MATERIALS – LIQUI-BOND – CONTINUED

Product Name	Description	Key Attributes	Thermal Conductivity (W/m•K)	Viscosity at 25°C (cP)	Dielectric Strength (V/25 µm)	Thickness (mm)	Flammability Rating
BERGQUIST® LIQUI-BOND TLB EA1800	A two-component, epoxy based, thixotropic liquid-dispensable adhesive	• Room temperature cure • Room temperature storage • Thermal Conductivity: 1.8 W/m·K • Eliminates need for mechanical fasteners • Maintains structural bond in severe-environment applications • Excellent chemical and mechanical stability	1.8	61,000	250	10 hr. at 25°C or 10 min. at 125°C	UL 94 V-0
BERGQUIST® LIQUI-BOND TLB SA2000	A high performance, thermally conductive, one-part liquid silicone adhesive that cures to a solid bonding elastomer	• High thermal conductivity: 2.0 W/m·K • Eliminates need for mechanical fasteners • One-part formulation for easy dispensing • Mechanical and chemical stability • Maintains structural bond in severe environment applications • Heat cure	2.0	200,000	250	20 min. at 125°C	UL 94 V-0
BERGQUIST® LIQUI-BOND TLB SA2005RT	A two-part, high performance silicone thermal adhesive that offers an adaptable cure at multiple temperatures from 25°C up to 180°C	• Thermally conductivity: 2.0 W/m·K • Adaptive thermal cure • No cure by-products • Cures and bonds at room temperature • Cure rate is greatly accelerated at elevated temperatures • Room temperature storage	2.0	70,000	275	7 days at 25°C or 1 hr. at 85°C	UL 94 V-0

PHASE CHANGE

Product Name	Description	Key Attributes	Thermal Conductivity (W/m•K)	Volume Resistivity (Ω-m)	Dielectric Breakdown Voltage	Thickness (mm)	Flammability Rating
BERGQUIST® HI-FLOW THF 1600G	Consists of a thermally conductive 55°C phase change compound coated on a fiberglass web. Is designed as a thermal interface material between a computer processor and a heat sink.	• Thermal impedance: 0.20°C-in^2 /W (at 25 psi) • Will not drip or run like grease • Phase change compound coated on a fiberglass carrier	1.6	1 x 10^8	300	0.127	UL 94V-0
BERGQUIST® HI-FLOW THF 1500P	A thermally conductive phase change material, reinforced with a polyimide film that provides high dielectric strength and cut through resistance	• Thermal Impedance: 0.20°C-in^2/W (at 25 psi) • 150°C high temperature reliability • Natural tack one side for ease of assembly • Exceptional thermal performance in an insulated pad	1.5	1 x 10^{12}	5,000	0.114 – 0.140	UL 94V-0

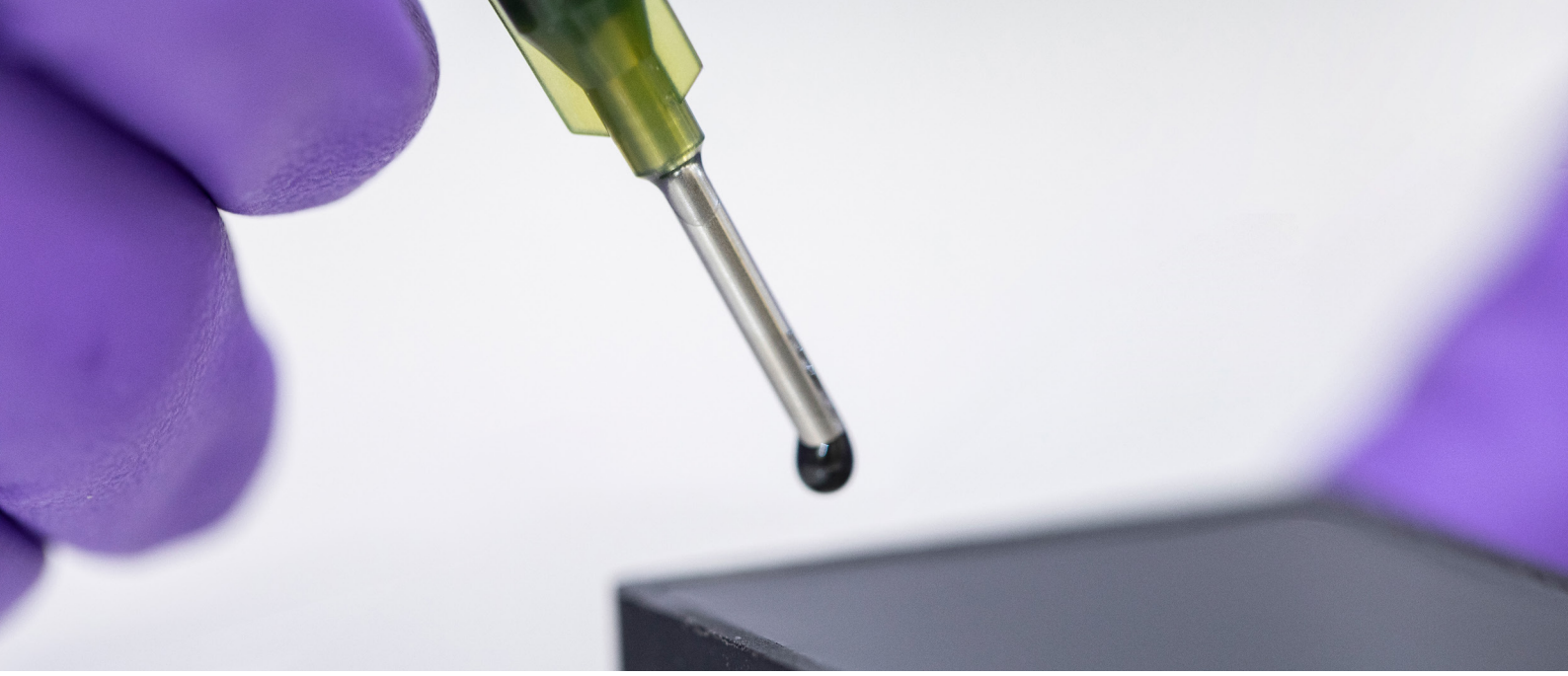
PHASE CHANGE (CONTINUED)

Product Name	Description	Key Attributes	Thermal Conductivity (W/m•K)	Volume Resistivity (Ω-m)	Dielectric Breakdown Voltage	Thickness (mm)	Flammability Rating
BERGQUIST® HI-FLOW THF 1600P	A thermally conductive 55°C phase change compound coated on a thermally conductive polyimide film	• Thermal impedance: 0.13°C-in^2/W (at 25 psi) • Field-proven polyimide film with excellent dielectric performance and cut-through resistance • Outstanding thermal performance in an insulated pad	1.6	1 x 10^{12}	5,000	0.102 – 0.127	UL 94V-0

Product Name	Description	Phase Change Temperature	Thermal Conductivity (W/m•K)	Specific Gravity	Recommended Drying Condition
LOCTITE® TCP 4000 PM	A reworkable and repeatable phase change material suitable for use between heat generating devices and the surfaces to which they are mounted or other heat dissipating surfaces	45°C	3.4	2	.051 mm thickness: 30 hr. at 22°C 22 min. at 60°C 3 min. at 125°C

BOND-PLY

Product Name	Description	Key Attributes	Thermal Conductivity (W/m•K)	Dielectric Breakdown Voltage	Thickness (mm)	Recommended Cure	Flammability Rating
BERGQUIST® BOND-PLY TBP 1400 LMS-HD	A thermally conductive, heat curable laminate material	• TO-220 Thermal performance: 2.3°C/W, initial pressure only lamination • Exceptional dielectric strength • Very low interfacial resistance • 200 psi adhesion strength • Continuous use of -60 – 180°C • Eliminates mechanical fasteners	1.4	5,000	0.254 – 0.457	30 min. at 125°C	UL 94V-0



PROTECTING MATERIALS FOR AC/DC & DC/DC

PCB AND COMPONENT PROTECTION

Electrical interconnection is bolstered through protection of the PCB and its components, with LOCTITE® and TECHNOMELT® brand circuit board protection materials delivering critical safeguarding against harsh industrial environments and delivering long-term defense against electrically harmful conditions. Conformal coatings keep electronic circuits shielded from moisture, chemicals and other contaminants; chip-on-board encapsulants provide a protective barrier for delicate components; underfills minimize stress on array devices; TECHNOMELT® low pressure molding materials provide a fast, non-damaging solution for electronic encapsulation; and potting materials in silicone, epoxy and polyurethane chemistries offer processing flexibility and maximum protection. With environmental consciousness as a priority, Henkel's materials development efforts focus on formulation of halogen-free, lead-free, solvent-free and low-VOC products.

PROTECTING MATERIALS FOR AC/DC & DC/DC

POTTING MATERIALS			CIRCUIT BOARD PROTECTION			UNDERFILL
Polyurethane	Epoxy		Silicone	Conformal Coating	Low Pressure Molding	Epoxy
LOCTITE® STYCAST US 2350	LOCTITE® STYCAST ES 4512	LOCTITE® STYCAST EE 4215 HD 0243	LOCTITE® STYCAST EE 4215 HD 0243	LOCTITE® STYCAST PC 40 UMF	TECHNOMELT® PA 646	LOCTITE® 3508NH
LOCTITE® STYCAST US 2651	LOCTITE® STYCAST 2850 FT CAT 11	LOCTITE® STYCAST ES 2505	LOCTITE® STYCAST ES 2505	LOCTITE® STYCAST PC 62	TECHNOMELT® PA 2692	
	LOCTITE® STYCAST 2850FT CAT 23LV			LOCTITE® STYCAST SI 5293	TECHNOMELT® PA 6481	
	LOCTITE® STYCAST ES 2505 CAT 11			LOCTITE® STYCAST UV 7993		
				LOCTITE® STYCAST CC 8555		

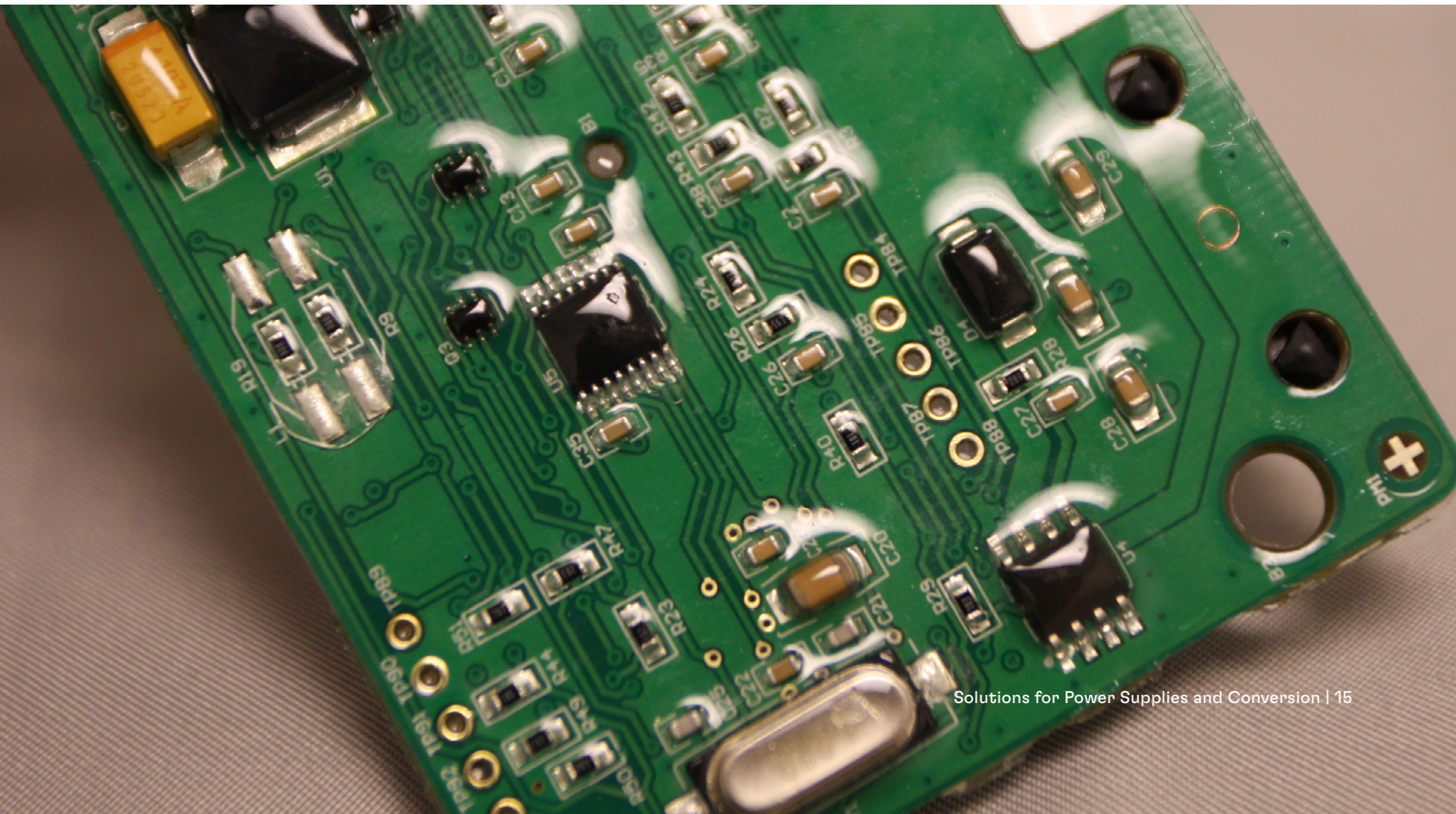
POTTING

Product Name	Alternate Cure	Viscosity cP at 25°C	Pot Life at 25°C	Hardness	Thermal Conductivity W/m·k	Temperature Range	Shelf Life
			Polyurethane				
LOCTITE® STYCAST US 2350	2 hr. at 60°C	2,400	45 min.	85A	0.510	-65°C – 125°C	1 year
LOCTITE® STYCAST US 2651	16 hr. at 25°C	1,000	10 min.	15A	0.180	-65°C – 125°C	1 year
			Epoxy				
LOCTITE® STYCAST ES 4512	36 – 48 at 25°C (Recommended Cure) 3 hr. at 60°C (Alternate cure)	19,000	200 g mass 60 min.	88D	0.644	-40°C – 125°C	1 year
LOCTITE® STYCAST 2850FT / CAT 11	8 – 16 hr. at 80°C 2 – 4 hr. at 100°C 30 – 60 min. at 120°C	64,000	100 g mass at 25°C for 1 hr.	96D	1.280	-55°C – 125°C	1 year
LOCTITE® STYCAST 2850FT / CAT 23lv	16 – 24 hr. at 25°C 4 – 6 hr. at 25°C 2 – 4 hr. at 65°C	5,600	100 g mass at 25°C for 1 hr.	92D	1.100	65°C – 105°C	1 year
LOCTITE® STYCAST ES 2505 / CAT 11	4 hr. at 100°C (w/CAT 11)	5,000	> 4 hr.	72D	0.820	-55°C – 155°C	1 year
LOCTITE® STYCAST EE 4215 / HD 0243	2 hr. at 80°C + 2hr. at 150°C	20,000 to 30,000	7 – 8 hr.	80 – 85D	0.480	-40°C – 180°C	6 months

Product Name	Description	Color	Cure Schedule	Application	Storage Temperature	Shelf Life
			Silicone			
LOCTITE® STYCAST 5954	Two-part, highly filled, addition-cure, thermally conductive silicone. High thermal conductivity. Noncorrosive.	Red	4 hr. at 65°C	Encapsulant	25°C	6 months at 25°C
LOCTITE® STYCAST US 2651	RTV condensation cure, silicone rubber potting compound is designed for potting and encapsulation	Red	16 – 24 hr. at 25 °C 2 – 4 hr. at 65°C	Potting or Encapsulant	25°C	152 days at 25°C

CONFORMAL COATINGS

Product Name	Description	Key Attributes	Viscosity at 25°C	Operating Temperature (°C)	Volume Resistivity (Ω·cm)	Color	Recommended Cure
LOCTITE® STYCAST PC 40-UMF	Urethane conformal coating	• One component • VOC-free • Conforms to IPC-CC-830 requirements	250	-40 – 135	3.50×10^{16}	Clear	10 sec. at 300 – 600 mW/cm² + 2 – 3 days at atmospheric moisture
LOCTITE® STYCAST UV 7993	Urethane conformal coating	• One component • Solvent-free • Good moisture resistance • Excellent chemical resistance	120	-40 – 130	2.20×10^{16}	Translucent Yellow	5 sec. at 400 – 700 mW/cm² + 100 hr. at 50% relative humidity
LOCTITE® STYCAST PC 62	Rapid drying acrylic for circuit board protection applications	• Fluorescent under UV light • Provides environmental and mechanical protection • Toluene-free alternative • Superior toughness and abrasion resistance • Easily removable with soldering iron or suitable solvent	50	-40 – 125	1.04×10^{16}	Colorless	24 hr. at 25°C
LOCTITE® SI 5293	Silicone conformal coating	• One component • Exhibits positive fluorescence under UV light • Repairable • Solvent-free • Designed for severe temperature environments and high-reliability automotive applications	400 – 800	-40 – 200	1.00×10^{14}	Transparent amber to yellow	20 – 40 sec. per side at 70 mW/cm² w 72 hr. at 50% relative humidity
LOCTITE® STYCAST CC 8555	Urethane conformal coating	• UV curable Room temperature moisture cure for shadowed areas • One component • VOC/Solvent free • Good moisture resistance • Excellent chemical resistance • Good wettability and void free	60	-40 – 130	1.46×10^{14} at 25°C	Clear Liquid	-

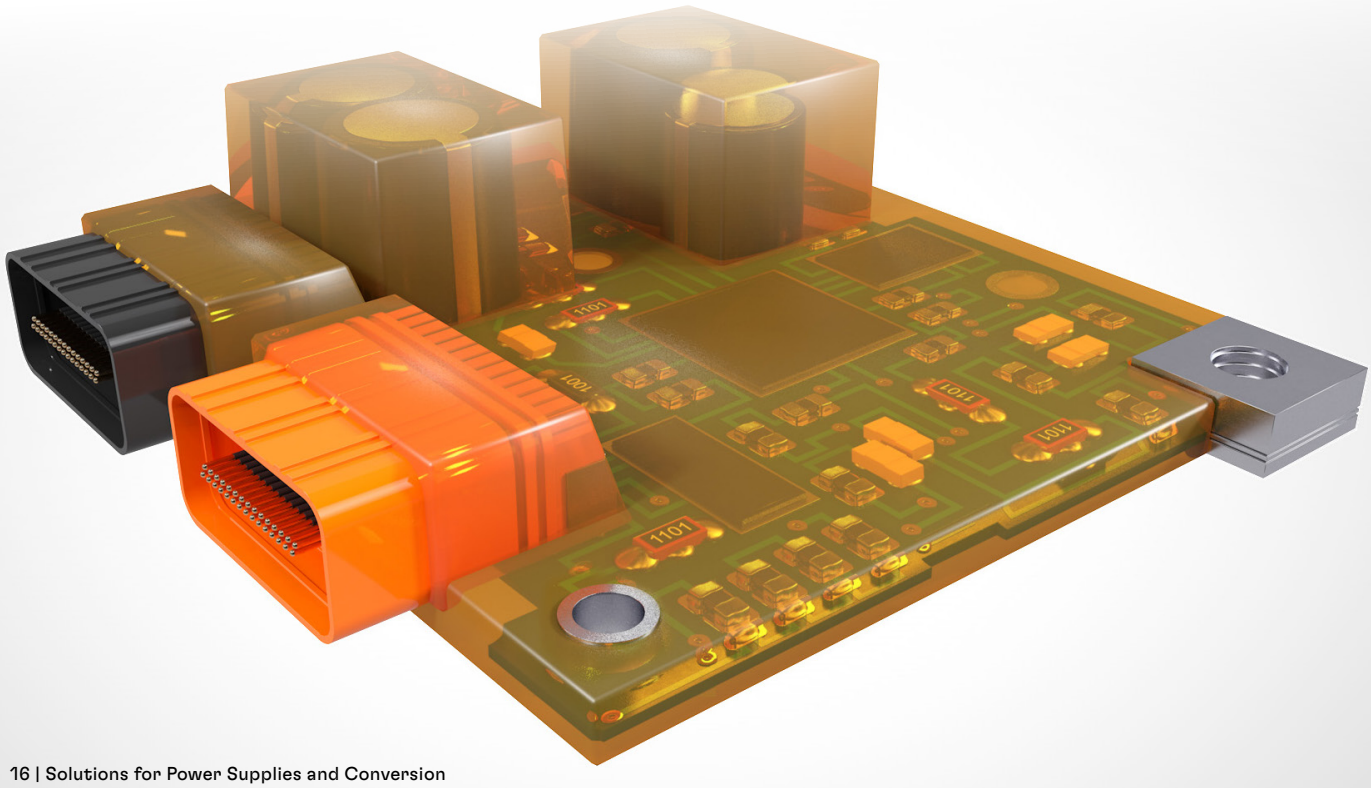


LOW PRESSURE MOLDING

Product Name	Description	Key Attributes	Color	Operating Temperature (°C	Shore Hardness
TECHNOMELT® PA 646	Moldable polyamide	▪ Ideal for applications where strength and hardness are needed ▪ Good adhesion for high-temperature applications	Black	-40 – 125°C	92A
TECHNOMELT® PA 6481	Moldable polyamide	▪ Used for molding applications ▪ This material is formulated with improved UV stability ▪ Especially suitable for outdoor applications.	Black	-40 – 130°C	93A
TECHNOMELT® PA 2692	Moldable polyamide	▪ Suitable for high-humidity applications ▪ Formulated for very low water vapor transmission	Amber	-40 – 150°C	88A

UNDERFILLS

Product Name	Description	Key Attributes	Viscosity at 25°C (cP)	Glass Transition Temperature, Tg (°C)	Coefficient of Thermal Expansion, CTE (ppm/°C)		Pot Life	Recommended Cure
					Below T_g	Above T_g		
LOCTITE® 3508NH	Reworkable cornerfill designed to cure during pb-free reflow while allowing self-alignment of IC components	▪ One component ▪ Reflow curable ▪ Eliminates post-reflow dispense and cure steps ▪ Reworkable ▪ Halogen-free	70,000	118	65	175	30 days at 25 °C	Cure during Pb-free solder reflow profile at 245°C



PROTECTING MATERIALS FOR AC/DC & DC/DC

PCB AND COMPONENT PROTECTION

Electrical interconnection is bolstered through protection of the PCB and its components, with LOCTITE® and TECHNOMELT® brand circuit board protection materials delivering critical safeguarding against harsh industrial environments and delivering long-term defense against electrically harmful conditions. Conformal coatings keep electronic circuits shielded from moisture, chemicals and other contaminants; chip-on-board encapsulants provide a protective barrier for delicate components; underfills minimize stress on array devices; TECHNOMELT® low pressure molding materials provide a fast, non-damaging solution for electronic encapsulation; and potting materials in silicone, epoxy and polyurethane chemistries offer processing flexibility and maximum protection. With environmental consciousness as a priority, Henkel's materials development efforts focus on formulation of halogen-free, lead-free, solvent-free and low-VOC products.

BONDING MATERIALS FOR AC/DC

ASSEMBLY ADHESIVES MATERIALS				THERMALLY CONDUCTIVE ADHESIVES		THREAD LOCKING ADHESIVES
Acrylate	Epoxy		Cyanoacrylate	Silicone	Acrylic	Silicone	Acrylic
LOCTITE® 3875	LOCTITE® 3611	LOCTITE® 3621	LOCTITE® 444	LOCTITE® SI 5404	LOCTITE® 315	BERGQUIST® LIQUI BOND TLB SA2005RT	LOCTITE® 243
	LOCTITE® 3614	LOCTITE® 3627	LOCTITE® 4211		LOCTITE® 384		
	LOCTITE® 3616	LOCTITE® CB 3626MHF					
		LOCTITE® ABLESTIK 84-3J					

BONDING MATERIALS FOR DC/DC

ASSEMBLY ADHESIVES			THREAD LOCKING ADHESIVES
Epoxy			Acrylic
LOCTITE® 3609	LOCTITE® 3621	LOCTITE® 3629C	LOCTITE® 243
LOCTITE® 3611	LOCTITE® 3626M	LOCTITE® 4211	
LOCTITE® 3614	LOCTITE® CB 3626MHF		

ASSEMBLY ADHESIVES

Product Name	Description	Chemistry	Color	Cure Speed	Application	Storage Temp
			Acrylate			
LOCTITE® 3875	Bead-on-bead, thermally conductive adhesive is designed to thermally couple and structurally bond heats sinks to heat dissipating electronic components	Acrylate	Part A - Pale Yellow Part B - Pale Blue	24 – 72 hr. at 23°C , 50% RH	Thermal management	Optimal Storage (PART A): -20 °C Alternative Storage (PART A): 2 – 8 °C Optimal Storage (PART B): 2 – 8 °C
			Epoxy			
LOCTITE® 3609	Designed for the bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Dark, red viscous gel	90 – 120 sec. at 150°C	Surface mount adhesive	2 – 8°C
LOCTITE® 3611	Designed for bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red viscous gel	90 – 120 sec. at 150°C	Surface mount adhesive	2 – 8°C
LOCTITE® 3614	Designed for bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red viscous gel	90 – 120 sec. at 150°C	Surface mount adhesive	2 – 8°C
LOCTITE® 3616	Designed for bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red viscous pastel	90 – 120 sec. at 150°C	Surface mount adhesive	2 – 8°C
LOCTITE® 3616	Designed for bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red viscous gel	90 – 120 sec. at 150°C	Surface mount adhesive	2 – 8°C
LOCTITE® 3621	Designed for bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red viscous gel	90 – 120 sec. at 150°C	Surface mount adhesive	2 – 8°C
LOCTITE® 3626M	Designed for bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red gel-like material	Minimum 120 sec. at 130°C or 90 sec. at 150°C at the bondline	Surface mount adhesive	2 – 8°C
LOCTITE® CB 3626MHF	Designed for bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red gel-like material	30 min. at 150°C	Component assembly, NCA, surface mount adhesive	2 – 8°C

ASSEMBLY ADHESIVE (CONTINUED)

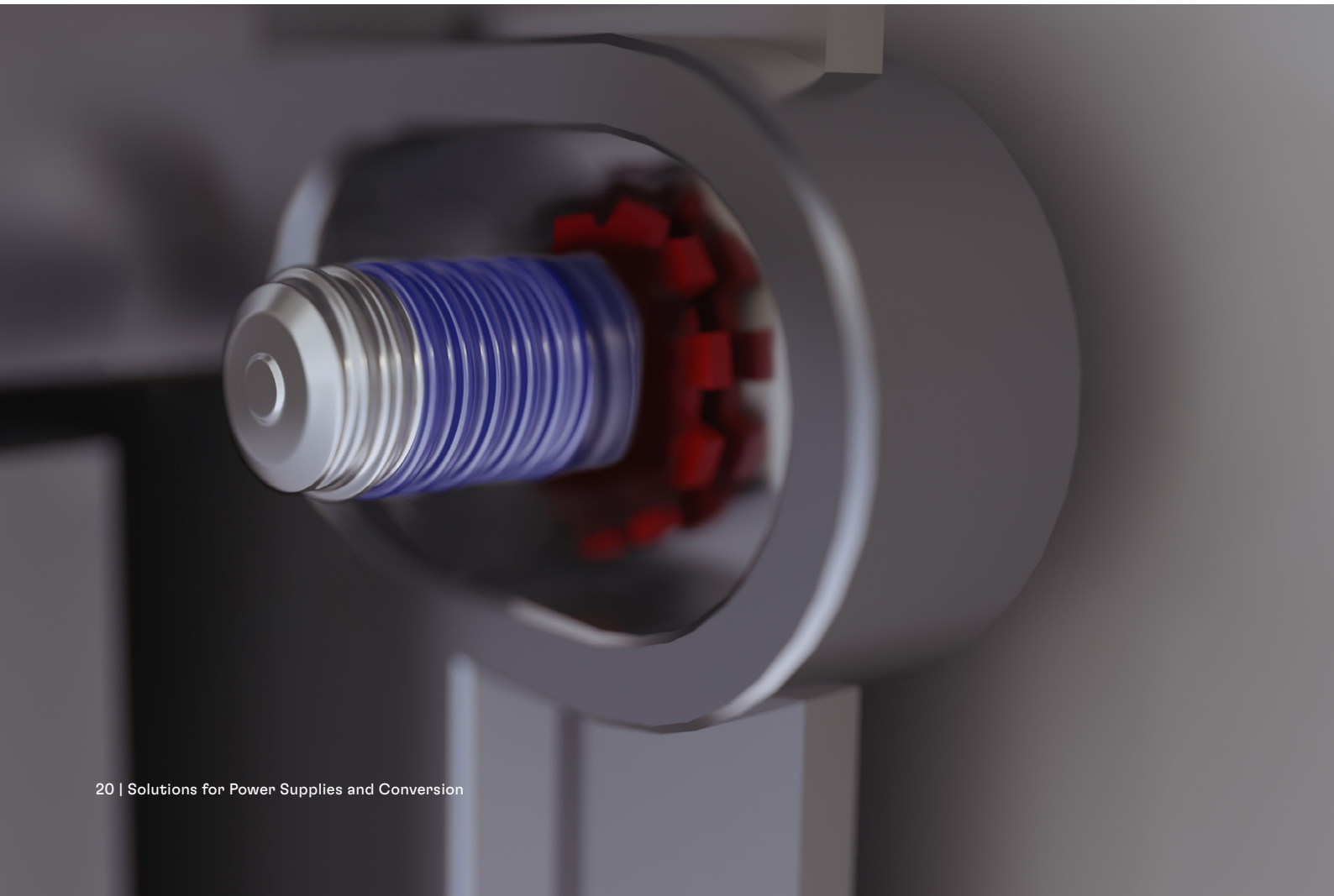
Product Name	Description	Chemistry	Color	Cure Speed	Application	Storage Temp
LOCTITE® 3614	Designed for the bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red viscous gel	90 – 120 sec. at 150°C	Surface mount adhesive	2 – 8°C
LOCTITE® 3627	Designed for the bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red gel-like material	90 – 120 sec. at 150°C	Surface mount adhesive	2 – 8°C
LOCTITE® 3616	Designed for the bonding of surface mounted devices to printed circuit boards prior to wave soldering	Epoxy	Red viscous pastel	90 – 120 sec. at 150°C	Surface mount adhesive	2 – 8°C
LOCTITE® ABLESTIK 84-3J	Adhesive is designed for die attach applications as well as component attach	Epoxy	Blue	1 hr. at 150°C 2 hr. at 125°C	Die Attach	-40 °C
			Silicone			
LOCTITE® SI 5699	Designed primarily for flange sealing with excellent oil resistance on rigid flange sealing for example on transmissions and cast metal housings.	Oxime silicone	Grey Paste	Cured for 1 week at 25 °C / 50±5 % RH	Sealing	8 – 21°C
LOCTITE® SI 5404	Designed to bond metallic heat sinks, ceramic chips and circuit board substrates	Silicone	White to gray pastel	1 hr. at 150 °C	Bonding	2 – 8°C

THERMALLY CONDUCTIVE ADHESIVES

Product Name	Description	CURE TYPE	Thermal Conductivity (W/m·k)	Volume Resistivity (Ω-m)	Cure Schedule	Shelf Life
			Acrylic			
LOCTITE® 315	A self-shimming, thermally-conductive, one-part adhesive for bonding electrical components to heat sinks with an insulating gap	Activator (7387)	0.81	1.3×10^{12}	24 – 72 hr. at 20°C	9 months at 5°C
LOCTITE® 384	Repairable, room-temperature, curing adhesive utilized for parts subject to disassembly	Activator (7387)	0.76	1.3×10^{12}	24 – 72 hr. at 20°C	9 months at 5°C
BERGQUIST® LIQUI-BOND TLB SA2005RT	A two-part, high performance silicone thermal adhesive	Two-Part	2.00	1.0×10^{13}	7 days at 25°C or 1 hr. at 85°C	6 months at 5 – 25°C

THREAD LOCKING ADHESIVES

Product Name	Description	Chemistry	Color	Cure Speed	Viscosity cP at 25°C
		Acrylic			
LOCTITE® 243	General purpose threadlocker of medium bond strength. This threadlocker secures and seal bolts, nuts and studs to prevent loosening due to vibration.	Acrylic	Blue	24 hr.	1,300 – 3,000



GET IN TOUCH *WITH US*

FORMULATED FOR ***CONTINUOUS PERFORMANCE*** *AND* ***SUSTAINABLE RESULTS***

Henkel materials are driving value for the Industrial Automation & Power Conversion market through high-performance formulas that secure steadily operation with effective thermal management, durable adhesion, efficient protection, reliable electrical function and long-term sustainability.

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