

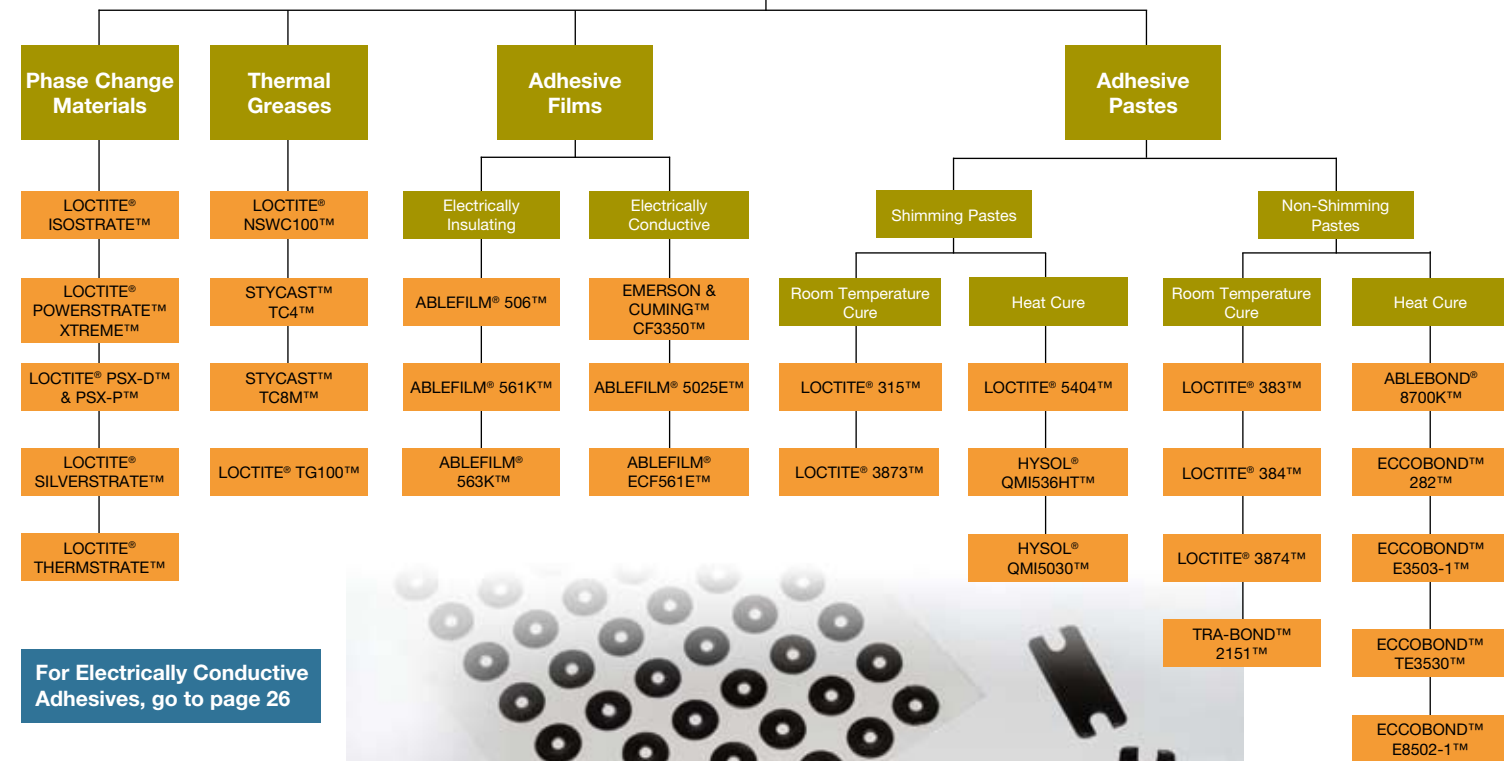
ASSEMBLY MATERIALS

THERMAL MANAGEMENT MATERIALS

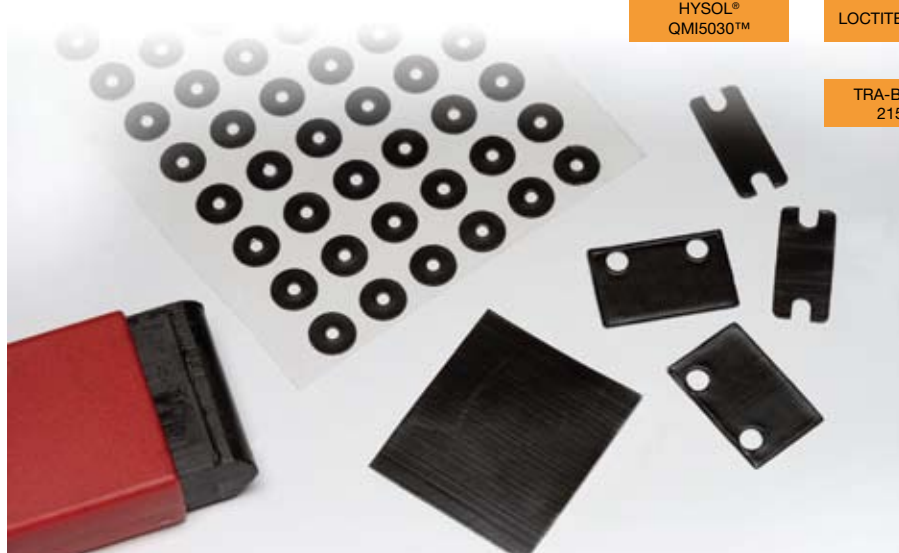
Henkel's thermal materials scientists have developed some unique and user-friendly products to address the requirements of today's thermal transfer priorities. The Loctite® line of Phase Change Thermal Interface Materials (PCTIM) offers exceptionally low thermal impedance between heat dissipating devices and the surface to which the component is mounted. The premiere product in this line-up, Loctite® Powerstrate™ Xtreme™ adheres to heat sinks or components without heating, delivering amazing ease-of-use without compromising thermal performance.

Henkel offers a wide range of thermally conductive film adhesives that are ideal for bonding large areas or complex shapes. With customized preforms, adhesive can be placed precisely where needed, whether around through-holes or on any area requiring a specialized pattern, delivering exceptional accuracy and enhanced performance. Offering the perfect blend of high thermal conductivity with varying degrees of flexibility and adhesion, Henkel's thermally enhanced film products have been specially formulated for heat sink or thermal dissipation applications.

Thermal Management Materials



For Electrically Conductive Adhesives, go to page 26



ASSEMBLY MATERIALS

THERMAL MANAGEMENT MATERIALS



PHASE CHANGE MATERIALS

PRODUCT	DESCRIPTION	THERMAL IMPEDANCE (°C-in. ² /W @ 80 psi)	THERMAL IMPEDANCE (°C-cm ² /W @ 550 kPa)	THERMAL CONDUCTIVITY (W/mK)	PHASE CHANGE TEMP (°C)	VOLUME RESISTIVITY (OHM.CM)	DIELECTRIC STRENGTH (V/mil)	THICKNESS (in)
LOCTITE® ISOSTRATE™	Industry standard electrically insulating phase change material.	0.12	0.78	0.45	60	N/A	4,500 minimum	0.002 - 0.006
LOCTITE® POWERSTRATE™ XTREME™	Unsupported film with superior thermal performance even at low pressure. Direct attach to heat sink at room temperature without adhesive.	0.003	0.022	3.4	45	N/A	N/A	0.008
LOCTITE® PSX-D™ & PSX-P™	Repeatable phase change thermal interface material. Supplied as a paste that can be stenciled, needle dispensed, screen printed, or applied manually onto a heat sink, baseplate or other surfaces.	0.003	0.022	3.4	45	N/A	N/A	0.0005 - 0.010+
LOCTITE® SILVERSTRATE™	Excellent thermal performance particularly at higher pressures. Typically used on RF devices and SCRs where electrical conductivity is required (silver-filled).	0.003	0.022	3.14	51	2	N/A	0.004
LOCTITE® THERMSTRATE™	Industry standard phase change thermal interface material. Suitable for power IGBTs, semiconductors, DC-DC converters and other electrically isolated packages.	0.022	0.143	1	60	1.0 x 10 ¹²	N/A	0.0025 - 0.008

THERMAL GREASES

PRODUCT	DESCRIPTION	THERMAL CONDUCTIVITY (W/mK)	VOLUME RESISTIVITY (OHM.CM)	DIELECTRIC STRENGTH (V/mil)	THICKNESS (in)
LOCTITE® NSWC100™	Non-silicone, water cleanable thermal compound.	1.4	1.9 x 10 ¹⁵	250 minimum	0.0005 to 0.010+
STYCAST™ TC4™	Thermally conductive, high temperature silicone thermal grease.	1.5	1 x 10 ¹³	500	0.0005 to 0.010+
STYCAST™ TC8M™	High thermal conductivity, high temperature thermal grease.	2.3	1 x 10 ¹³	500	0.0005 to 0.010+
LOCTITE® TG100™	Ultra-high performance thermal grease.	3.4	N/A	N/A	0.0005 to 0.010+

THERMALLY CONDUCTIVE ADHESIVE FILMS – ELECTRICALLY INSULATING

PRODUCT	DESCRIPTION	TENSILE STRENGTH LAP SHEAR (PSI)	THERMAL CONDUCTIVITY (W/mK)	VOLUME RESISTIVITY (OHM.CM)	PRIMARY CURE CYCLE	SHELF LIFE	FILM THICKNESS AVAILABLE (MILS)
ABLEFILM® 506™	Flexible film adhesive designed for bonding TCE mismatched materials. Slight tack can simplify assembly.	1,200	0.9	7 x 10 ¹²	1 hr. @ 150°C	6 months @ -40°C	4, 5, 6
ABLEFILM® 561K™	High adhesion strength with excellent flexibility for bonding mismatched CTE materials.	3,300	0.9	9 x 10 ¹²	30 min. @ 150°C	1 year @ -40°C	4, 5, 6
ABLEFILM® 563K™	Electrically insulating film with high thermal conductivity and adhesion strength. Available either unsupported or with a fiberglass carrier.	3,000	1	1 x 10 ¹³	30 min. @ 150°C	1 year @ -40°C	2, 3, 4, 5, 6

THERMALLY CONDUCTIVE ADHESIVE FILMS – ELECTRICALLY CONDUCTIVE

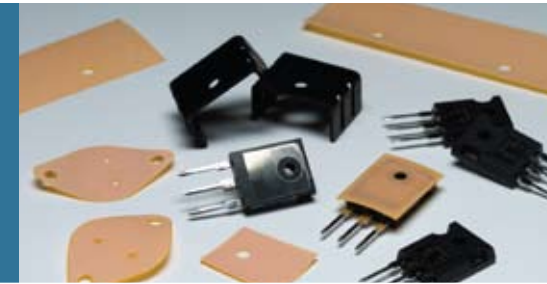
PRODUCT	DESCRIPTION	TENSILE STRENGTH LAP SHEAR (PSI)	THERMAL CONDUCTIVITY (W/mK)	VOLUME RESISTIVITY (OHM.CM)	PRIMARY CURE CYCLE	SHELF LIFE	FILM THICKNESS AVAILABLE (MILS)
EMERSON & CUMING™ CF3350™	Silver-filled film with an excellent balance of adhesion strength, electrical and thermal conductivity, and processability. It is specially suited for RF applications.	3,400	7	0.0002	30 min. @ 150°C	9 months @ 5°C	2, 4
ABLEFILM® 5025E™	Sister formulation to CF3350™ that has been certified to MIL-STD-883, Method 5011.	2,500	6.5	0.0002	30 min. @ 150°C	6 months @ 5°C	2, 3, 4, 5, 6
ABLEFILM® ECF561E™	Most flexible of the fiberglass-supported, electrically conductive products.	2,000	1.6	0.0060	1 hr. @ 150°C	1 year @ -40°C	4, 5, 6

ASSEMBLY MATERIALS

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THERMAL MANAGEMENT MATERIALS

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THERMALLY CONDUCTIVE ADHESIVES – SHIMMING – ROOM TEMPERATURE CURE

PRODUCT	DESCRIPTION	MIL STANDARD 883, METHOD 5011 APPROVED	NASA OUTGASSING ASTM E 595-77/84/90 APPROVED	CURE TYPE	CURE SCHEDULES	VISCOSITY (cPs)	THERMAL CONDUCTIVITY (W/mK)	VOLUME RESISTIVITY (OHM.CM)	SHELF LIFE
LOCTITE® 315™	A self-shimming, thermally conductive, one-part adhesive for bonding electrical components to heat sinks with an insulating gap.			Activator or Heat	24-72 hrs. @ 20°C	600,000	0.81	1.3 x 10 ¹²	9 months @ 5°C

THERMALLY CONDUCTIVE ADHESIVES – SHIMMING – HEAT CURE

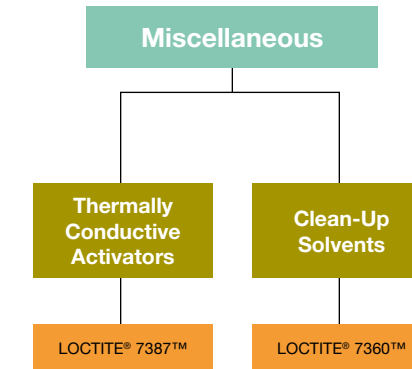
LOCTITE® 3873™	Self-shimming, use with activator 7387™. High bonding strength for heat sink application.			Activator or Heat	Fixture time: 5 min.	200,000	1.25	4.3 x 10 ¹⁴	21 months @ 5°C
LOCTITE® 5404™	Self-shimming, flexible silicone adhesive for high temperature resistant applications such as ceramic boards.			Heat	10 min. @ 150°C	Paste	1.0	2.9 x 10 ¹⁴	5 months @ 5°C
HYSOL® QMI536HT™	Boron nitride-filled non-electrically conductive paste.			Heat	≥8 sec. @ 150°C (SkipCure™) 15 min. @ 150°C (oven)	13,000	0.9	1.0 x 10 ¹³	12 months
HYSOL® QMI5030™	Unique product resulting from blend of thermoset and thermoplastic resins.			Heat	30 min. @ 175°C (oven)	5,500	25	0.00004	12 months

THERMALLY CONDUCTIVE ADHESIVES – NON-SHIMMING – ROOM TEMPERATURE CURE

LOCTITE® 383™	High strength, room temperature curing adhesive for permanent assemblies.			Activator or Heat	24-72 hrs. @ 20°C	500,000	0.6	5.2 x 10 ¹¹	9 months @ 5°C
LOCTITE® 384™	Repairable, room temperature curing adhesive utilized for parts subject to disassembly.			Activator or Heat	24-72 hrs. @ 20°C	100,000	0.76	1.3 x 10 ¹²	9 months @ 5°C
TRA-BOND™ 2151™	Thermal conductive electrical insulating compound.		Yes	Activator or Heat	24 hrs. @ 25°C	40,000	0.95	2.10 x 10 ¹⁵	35 min.

THERMALLY CONDUCTIVE ADHESIVES – NON-SHIMMING – HEAT CURE

LOCTITE® 3874™	No-bead containing version of 3873™.			Activator (7387™) or Heat	24 hrs. @ 25°C	5 min. / 24-72 hrs. @ 20°C	1.25	4.3 x 10 ¹⁴	10 months @ 5°C
ABLEBOND® 8700K™	Mil standard certified, high performance, syringe dispensible, one-component, thermally conductive, epoxy adhesive.	Yes	Yes	Heat	60 min. @ 175°C 2 hrs. @ 160°C	45,000	0.5	3 x 10 ¹⁴	9 months @ -40°C
ECCOBOND™ 282™	One-component, silk screenable, viscous epoxy with high thermal conductivity.			Heat	4 hrs. @ 100°C	280,000 - 380,000	1.3	1.0 x 10 ¹⁵	3 months
ECCOBOND™ E3503-1™	Smooth paste assuring minimum bondline thickness for lower overall thermal resistance.			Heat	30 min. @ 100°C 10 min. @ 120°C 5 min. @ 150°C	60,000	1	1.0 x 10 ¹⁴	6 months @ -18°C to -25°C
ECCOBOND™ TE3530™	One-component, low temperature curing, thermally conductive epoxy adhesive.			Heat	30 min. @ 100°C	60,000	2.3	1.0 x 10 ¹⁵	6 months @ -18°C to -25°C
ECCOBOND™ E8502-1™	This low modulus, thermally conductive, modified epoxy adhesive is ideally suited for management of large CTE mismatch & bonding of stress sensitive components.			Heat	90 min. @ 120°C 60 min. @ 150°C 15 min. @ 175°C	45,000	0.6	4.07 x 10 ¹³	6 months @ -18°C to -25°C



MISCELLANEOUS ADHESIVES – THERMALLY CONDUCTIVE ACTIVATORS

PRODUCT	DESCRIPTION
LOCTITE® 7387™	Activator used in combination with Loctite® brands 315™, 383™, 384™.

MISCELLANEOUS ADHESIVES – CLEAN-UP SOLVENTS

PRODUCT	DESCRIPTION	SOLVENT TYPE	FLASH POINT
LOCTITE® 7360™	Nozzle and dispense machine component cleaner. Excellent for removal of uncured adhesive from the board without causing the adhesive to gel. Available in environmentally responsible pump spray non-aerosol can for nozzle cleaning.	Aliphatic Ester Blend	100°C

