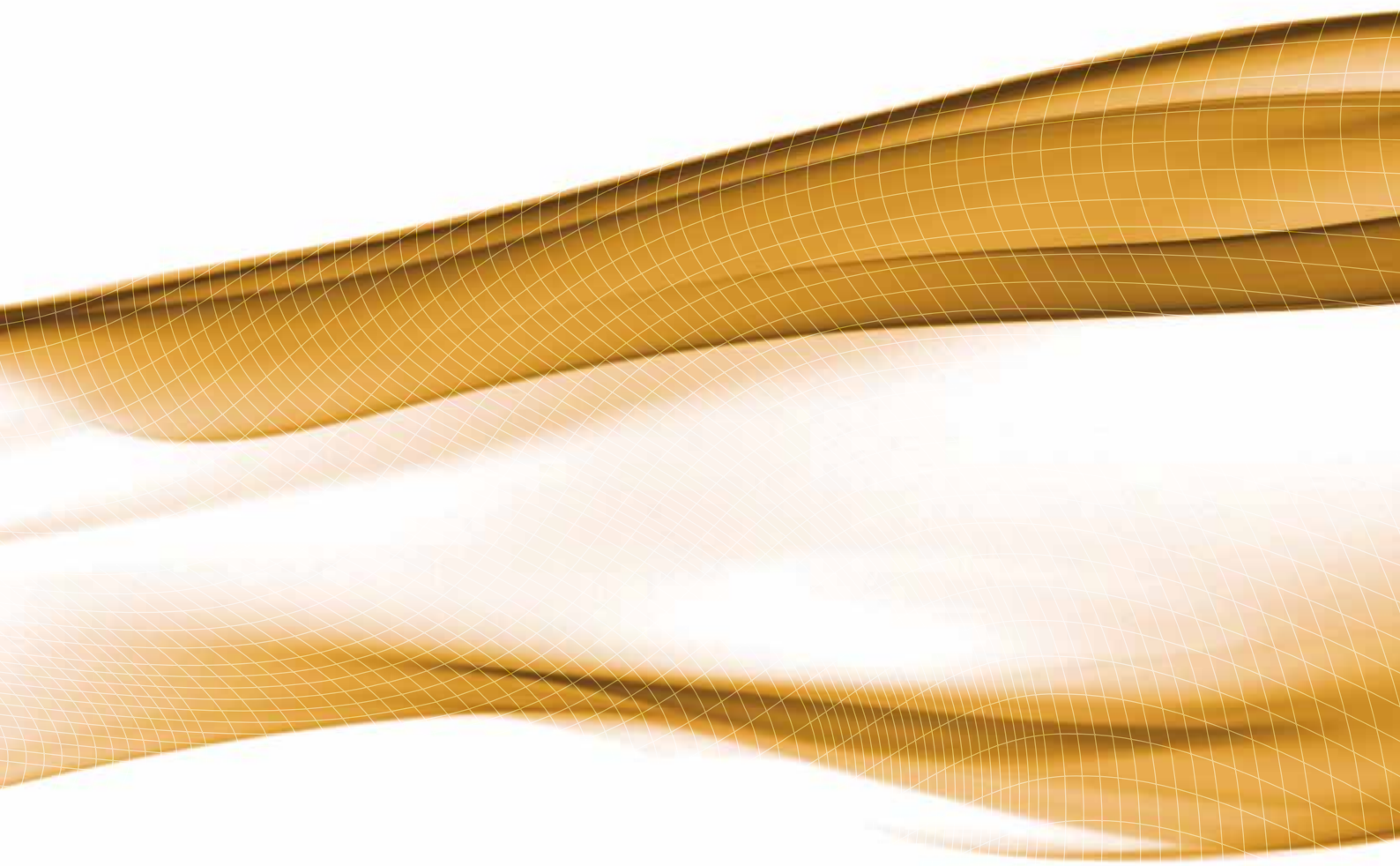
Thermal Management Solutions

Created to perform when the heat is on



ELECTROLUBE
THE SOLUTIONS PEOPLE

Thermal Management Solutions

- Non-Silicone Pastes
- Silicone Pastes
- RTVs and Bonding Products
- Encapsulation Resins
- 0.9 to 3.4W/m.K

During use, some electronic components can generate significant amounts of heat. Failure to effectively dissipate this heat away from the component and the device can lead to reliability concerns and reduced operational lifetimes.

Newton's law of cooling states that the rate of loss of heat is proportional to the temperature difference between the body and its surroundings. Therefore, as the temperature of the component increases and reaches its equilibrium temperature, the rate of heat loss per second will equate to the heat produced per second within the component. This temperature may be high enough to significantly shorten the life of the component or even cause the device to fail. It is in such cases that thermal management measures need to be taken. The same considerations can be applied to a complete circuit or device which incorporates heat producing individual components.

Heat is lost from a component to its surroundings at the surface of the component. The rate of loss of heat will increase with the surface area of the component; a small device producing 10 watts will reach a higher temperature than a similar powered device with a larger surface area.

This is where heat sinks are used – varying in size and shape, heat sinks can be designed to offer a significantly increased surface area to maximise heat dissipation. They are typically connected to components which generate a large amount of thermal energy when used and therefore dissipate such energy away from the device to avoid failure due to over-heating.

Heat sinks have proven to be very effective over the years however in order to ensure full contact and therefore maximum efficiency, thermal management products are used alongside.

Metal surfaces, even when polished to a fine degree, have a certain amount of roughness. It can therefore be deduced that when two metal surfaces are placed together contact is not 100% and there will always be an air gap between the two surfaces. The use of a thermal interface material between such gaps ensures complete contact between the two surfaces and in turn more efficient heat conductance.

The ongoing trend for product miniaturisation – coupled with more modern, higher powered devices – has ensured that efficient thermal management is an essential part of both modern and future electronics design, the LED lighting market being just one example. Thermal management products are also offering solutions for greater efficiency in green energy development; photovoltaic inverters – which are known to be particularly sensitive to temperature; connections between the heat-pipe and water storage tank for solar-heating applications; hydrogen fuel cells; wind power generators, are just a few examples.

The Product Range

Thermal Pastes

HTC – Non-Silicone Heat Transfer Compound

- Excellent non-creep characteristics
- High thermal conductivity: 0.90 W/m.K
- Wide operating temperature range: -50°C to +130°C
- Low evaporation weight loss
- Available in aerosol form, HTCA
- Low in toxicity

HTS – Silicone Heat Transfer Compound

- Excellent non-creep characteristics
- Very wide operating temperature range -50°C to +200°C
- Very low evaporation weight loss
- High thermal conductivity even at high temperatures: 0.90 W/m.K
- Low in toxicity and economic in use
- White colour enables treated parts to be easily identified

HTCP – Non-Silicone Heat Transfer Compound Plus

- Excellent non-creep characteristics
- Very high thermal conductivity: 2.50 W/m.K
- Wide operating temperature range: -50°C to +130°C
- Low evaporation weight loss
- White colour enables treated parts to be easily identified
- Low in toxicity

HTSP – Silicone Heat Transfer Compound Plus

- Superior thermal conductivity even at high temperatures: 3.0 W/m.K
- Excellent non-creep characteristics
- Very wide operating temperature range: -50°C to +200°C
- Very low evaporation weight loss
- Low viscosity for ease of processing
- Low in toxicity

HTCPX – Non-Silicone Heat Transfer Compound Plus Xtra

- Excellent non-creep characteristics
- Vibration stable, designed for gap filling applications
- Wide operating temperature range: -50°C to +130°C
- Exceptional thermal conductivity: 3.40 W/m.K
- Low in toxicity
- Low evaporation weight loss

HTCX – Non-Silicone Heat Transfer Compound Xtra

- Very low oil bleed and evaporation weight loss
- Reduced viscosity for ease of application
- Excellent non-creep characteristics
- Wide operating temperature range: -50°C to +130°C
- Excellent thermal conductivity: 1.35 W/m.K
- Low in toxicity

Adhesives and Encapsulants

TCOR - Thermally Conductive Oxime RTV

- Single part, low odour RTV
- Very high thermal conductivity: 1.80 W/m.K
- Exceptionally wide operating temperature range: -50ºC to +230ºC
- Moisture cure – releasing oxime upon cure
- Easy to apply – use with TCR Gun Applicator
- Good bond strength and remains flexible at high temperatures

TCER - Thermally Conductive Ethoxy RTV

- Single part, low odour RTV
- Very high thermal conductivity: 2.20 W/m.K
- Moisture cure – releasing ethanol upon cure
- Low viscosity for ease of application – use with TCR Gun Applicator
- Remains flexible and elastic at high temperatures: -50ºC to +230ºC
- Low bond strength for ease of rework

TBS – Thermal Bonding System

- Two part epoxy bonding system
- Very high bond strength
- High thermal conductivity: 1.10 W/m.K
- Eliminates need for mechanical fixing by providing a permanent bond
- Wide operating temperature range: -40ºC to +120ºC
- Include glass beads for a set thickness to be applied

ER2220 – Thermally Conductive Epoxy Resin

- Very high thermal conductivity: 1.54 W/m.K
- Flame retardant
- Utilises non-abrasive fillers
- Used for encapsulating PCBs or devices requiring effective thermal dissipation
- Provides environmental protection
- Wide operating temperature range: -40ºC to +130ºC

ER2183 – Low Viscosity, Thermally Conductive Epoxy Resin

- Low viscosity alternative to ER2220: 5000mPa s
- High thermal conductivity: 1.10 W/m.K
- Easy to mix, uses non-abrasive fillers
- Used for encapsulating PCBs or devices requiring effective thermal dissipation
- Provides environmental protection
- Wide operating temperature range: -40ºC to +130ºC

UR5633 – Thermally Conductive Polyurethane Resin

- Flame retardant
- Excellent thermal conductivity: 1.24 W/m.K
- Excellent electrical properties
- Wide operating temperature range: -50ºC to +125ºC
- Very high water resistance
- Excellent performance in harsh conditions such as marine, automotive and tropical environments

SC2003 – Thermally Conductive Silicone Resin

- Flame retardant
- Good thermal conductivity: 0.80 W/m.K
- Excellent electrical properties
- Exceptionally wide operating temperature range: -60ºC to +200ºC
- Simple mix ratio: 1:1
- Especially suited to potting of electrical and electronic devices operating in high temperatures

**Various sizes are available for most products, including bulk.*

Thermal Management

	HTCX	HTCP	HTCPX	HTS	HTSP	TCOR	ER2220	ER2183	UR5633	SC2003
	Non-Silicone Heat Transfer Paste Xtra	Non-Silicone Heat Transfer Paste Plus	Non-Silicone Heat Transfer Compound Plus Xtra	Silicone Heat Transfer Compound	Silicone Heat Transfer Compound Plus	Thermally Conductive RTV	2 Part Epoxy Resin	2 Part Epoxy Resin	2 Part Polyurethane Resin	2 Part Silicone Resin
Thermal Conductivity (W/m.K)	1.35	2.50	3.40	0.90	3.00	1.80	1.54	1.10	1.24	0.8
Density (g/ml)	2.61	3.00	3.10	2.10	3.00	2.30	2.22	1.95	1.65	1.60
Viscosity/mPa s**	130,000	105,000	640,000	210,000	45,000	145,000	15,000	5,000	30,000	30,000
Cure Time (Hours @ 20°C / 60°C)	N/A	N/A	N/A	N/A	N/A	24*	24/4	24/4	24/4	24/1
Temperature Range (°C)	-50 to +130	-50 to +130	-50 to +130	-50 to +200	-50 to +200	-50 to +230	-40 to +130	-40 to +130	-50 to +125	-60 to +200
Evaporation Weight Loss (96hrs @ 100°C IP-183)	≤0.40%	≤1.00%	≤1.00%	≤0.80%	≤0.80%	N/A	N/A	N/A	N/A	N/A
Dielectric Strength (kV/mm)	42	42	42	18	18	>8	10	10	18	20
Volume Resistivity (Ω-cm)	1×10^{14}	1×10^{14}	1×10^{14}	1×10^{15}	1×10^{15}	1×10^{14}	1×10^{15}	1×10^{15}	1×10^{14}	1×10^{15}

** Requires moisture to cure, elevated temperatures not recommended unless moisture is present. **This information should be used as a guideline only.*

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