

CELERA

Passion for Technique

Advanced materials
for heat control
in electronics

PRODUCT AND SERVICE CATALOGUE



THERMAL
INTERFACES



TECHNICAL
SEALANTS



ENCAPSULATION



CFD SIMULATION
SERVICES

THERMAL INTERFACE MATERIALS

AS FILM

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FlexGRAF®

THERMAL INTERFACE GRAPHITE SHEET

FlexGRAF® redefines thermal interface materials with its exceptional thermal conductivity, delivering uniform heat distribution both in and through the plane. This property effectively prevents hot-spot formation, ensuring reliable and efficient thermal management.

Its flexible design allows easy customization into various shapes and sizes, making FlexGRAF® versatile for diverse applications. Notably, its excellent

compressibility minimizes thermal contact resistance, enhancing long-term performance in demanding environments.

Committed to environmental responsibility, FlexGRAF® adheres to RoHS and Reach standards, ensuring safe and sustainable use. Choose FlexGRAF® for a superior thermal interface solution that combines flexibility, efficiency, and compliance.

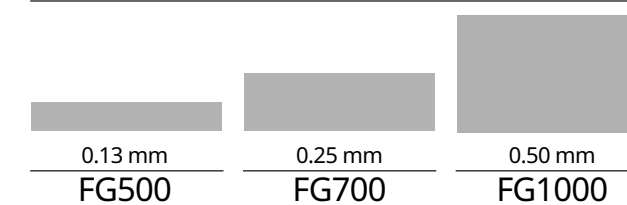
Features

- High Operating Temperature Resistance: up to 750°F
- Flammability class UL 94 V0
- Very high heat dissipation
- Capability to be laminated with an electrical insulation foil to offer dielectric resistance
- Easy to handle and assemble

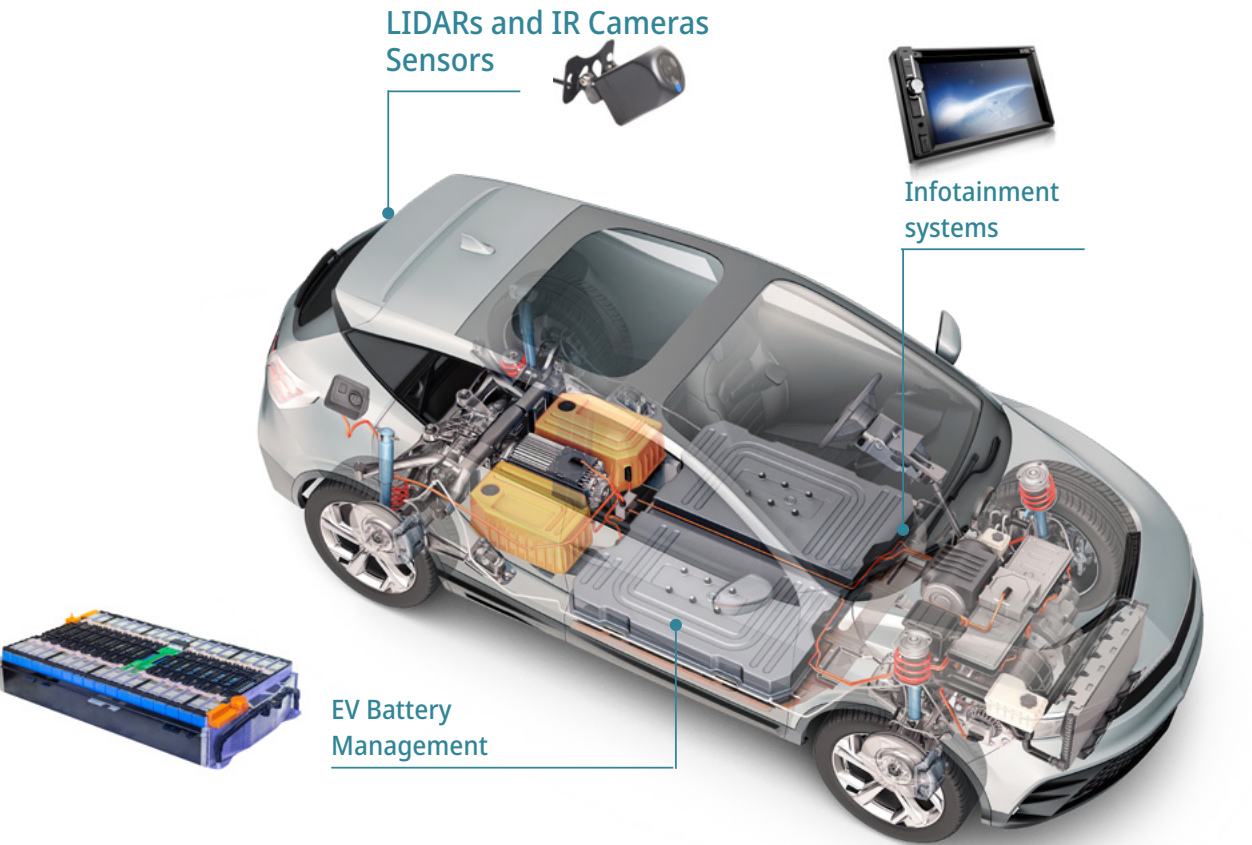
Delivery Format

- Rolls available in widths from 0.2" to 39.37" and lengths of 328 ft
- Options include rolls without adhesive or with adhesive on single or both sides
- Also available in die-cut pieces

Thickness

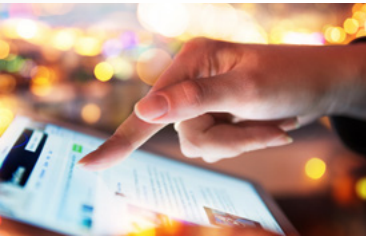


Automotive Applications



Consumer Goods and Industrial Equipment

- Mobile devices, Laptops and Tablets
- Servers, memory modules and GPUs
- Digital Displays
- Solar Power Systems



PROPERTIES	Standard	Unit	FG500	FG700	FG1000
Mechanical / Chemical					
Carbon Content	-	%	98	98	98
Thermal Filler	-	-	Graphite	Graphite	Graphite
Color	Visual	-	Dark Grey	Dark Grey	Dark Grey
Tear Strength	-	Mpa	3.1	3.1	4.4
Thickness	ASTM D374	mm	0.13	0.25	0.5
Density	ASTM D792	g/cm³	1.6	1.6	1.6
Hardness	ASTM D2240	Shore A	85.00	85	85
Outgassing, TML	ASTME595 Modified	%	0.15	0.15	0.15
Outgassing, CVM	ASTME595 Modified	%	0.09	0.09	0.09
Flammability Class	UL 94	-	V0	V0	V0
Shelf Life	-	years	5	5	5
Thermal					
Thermal Conductivity					
Direction x-y (horizontal)	ASTM D5470	W/m.k	350	350	350
Direction z (perpendicular)	ASTM D5470	W/m.k	15	15	15
Thermal Impedance	ASTM D5470 @70psi	°C-cm²/W	0.34	0.40	0.55
Temperature Resistance	ASTM D5470	°C	-40 to 400	-40 to 400	-40 to 400
Electrical					
Dielectric Strength	ASTM D149	kV/mm	0	0	0
Electrical Resistivity					
Direction x-y (horizontal)	ASTM D257	µΩm	65	65	65
Direction z (perpendicular)	ASTM D257	µΩm	1250	1250	1250

*Electrical conductive material, take precautions to prevent short circuits.

Application & Use Instructions

Surface preparation:

1. Ensure that the surface where you'll be attaching FlexGRAF® is clean, dry, and free of any dust, dirt, or grease. This is essential for a strong and lasting bond.

Part preparation:

2. Remove the protective liner, exposing the adhesive side.

Alignment:

3. Align the part to the target area without applying any pressure. This allows you to adjust the placement and make sure it's positioned correctly before committing to

the adhesive bond.

Apply pressure:

4. After placing the FlexGRAF® piece on the target surface, apply consistent and uniform pressure to ensure that there are no air gaps left beneath the adhesive.

Screw torque recommendation:

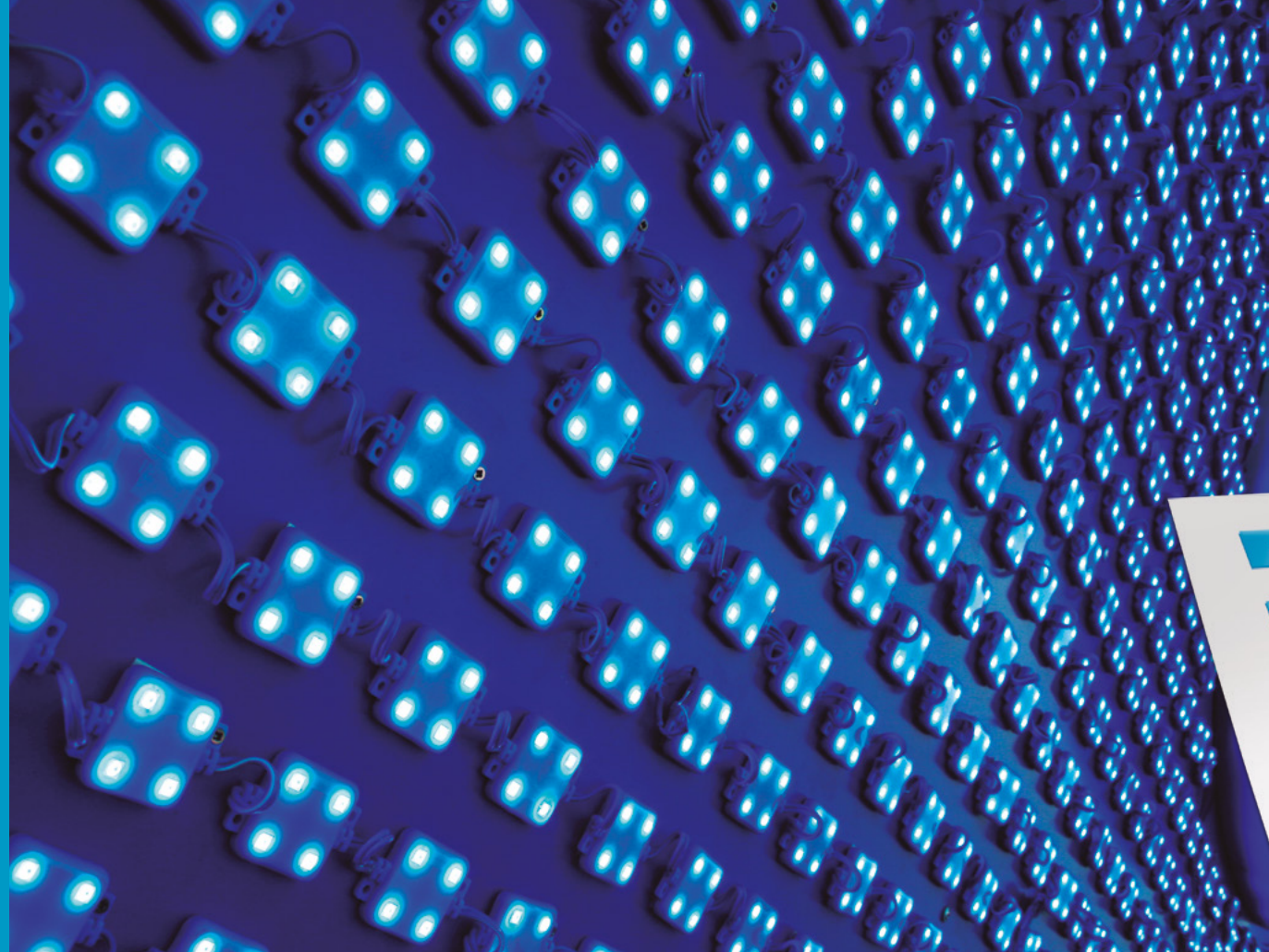
5. If your application includes screws to increase the mounting pressure, please refer to our "Torque Instruction Notes"

Removal Instructions

1. **Start at the Edge:** Identify a corner or edge of the FlexGRAF® part and gently lift it using your fingers or a flat-edged tool like a plastic scraper. Begin at a corner to avoid damaging the surface. Exercise patience and caution to prevent tearing the part or causing surface damage.
2. **Peel Slowly:** Once you've lifted the edge, continue to peel the adhesive part off the flat surface slowly and at a low angle. Use a flat-edged tool to gently separate the adhesive from the surface. Avoid applying excessive force, which could cause the adhesive to tear or leave residue.

3. **Remove residue (if needed):** Depending on how long the FlexGRAF® part has been in place, there might be residue left on the surface. If so, you can use a small amount of rubbing alcohol on a cloth to gently rub the residue away. Be cautious not to damage the surface.

4. **Assess for Damage:** Inspect the surface for any damage, such as scratches, that may have occurred during removal. Depending on the severity, you might need to take additional steps to restore the surface, such as polishing.



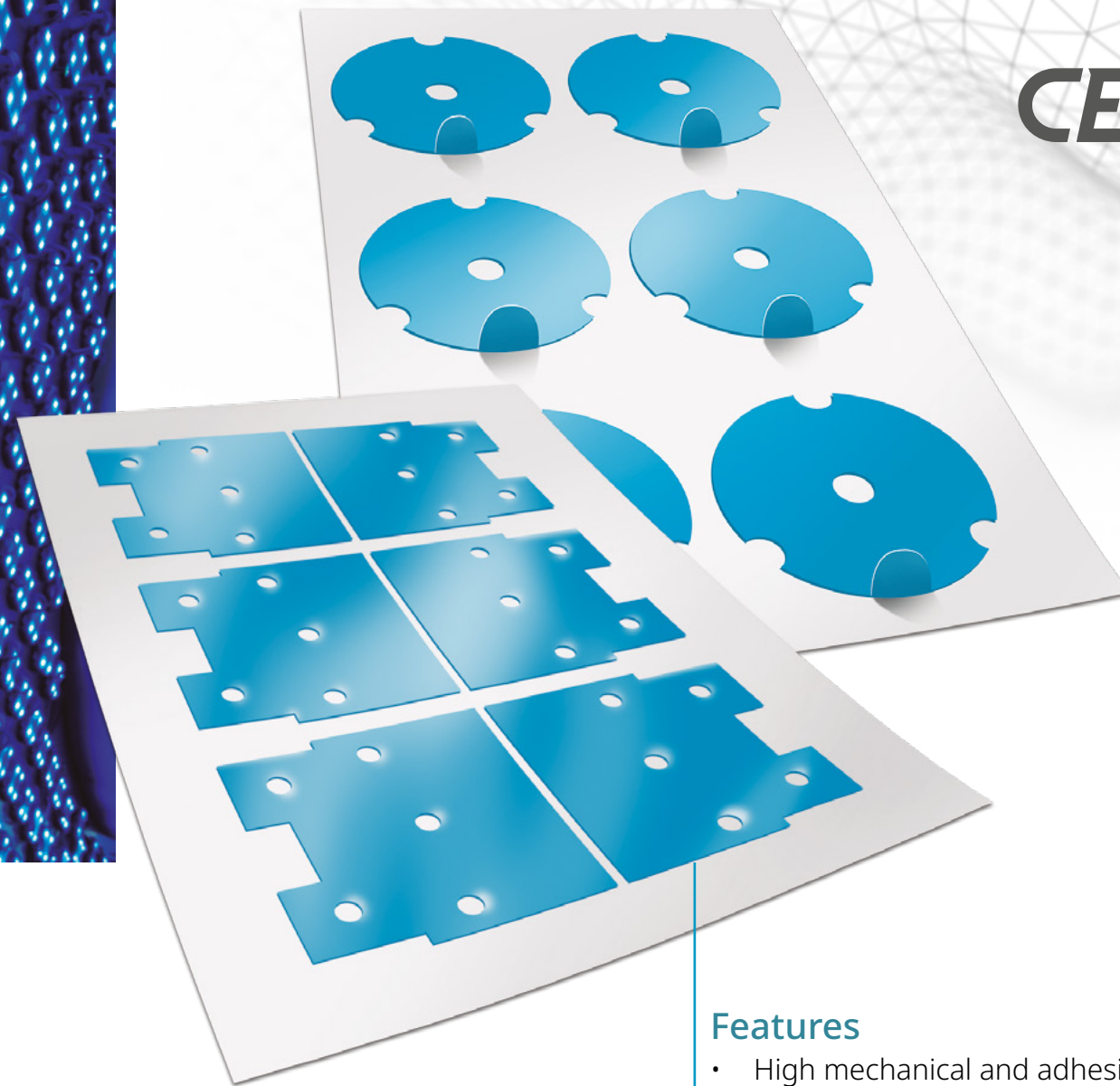
THERMALTape[®]

THERMALLY CONDUCTIVE DOUBLE SIDED TAPE

Introducing ThermalTape[®], an innovative double-sided adhesive tape meticulously engineered for exceptional mechanical strength and efficient thermal conductivity. Crafted with a durable fiberglass substrate enriched with ceramic nanoparticles, ThermalTape[®] offers unparalleled heat transfer capabilities.

At the heart of its performance lies the high-quality acrylic PSA adhesive, guaranteeing robust adhesion to a variety of surfaces,

including aluminum, polymers, and PMMA. ThermalTape[®] stands as the ultimate solution for efficient thermal management across diverse applications, seamlessly combining strength and thermal efficiency for optimal performance.



Features

- High mechanical and adhesion strength, replacing screws and other mechanical fasteners
- Electrically insulating properties
- RoHS and Reach compliant
- Good thermal conductivity

Delivery Format

- Rolls available from 0.20" to 39" wide and 82 feet long
- Option for liner on one or both sides
- Die-cut parts also available

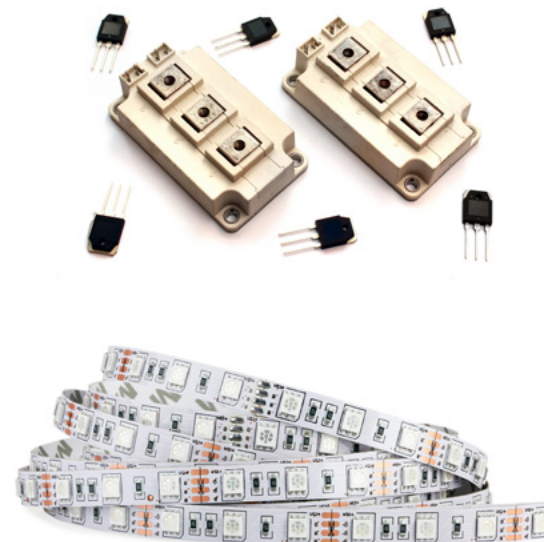
Automotive Applications



Other Applications

Consumer Goods and Industrial Equipment

- LED Modules and Linear Fixtures
- Semiconductor packages
- Electronic components
- Heat Sensors



PROPERTIES	Standard	Unit	TT150	TT900	TT1200
Mechanical / Mechanical					
Thermal Filler	-	-	Fiberglass/Ceramics	Fiberglass/Ceramics	Fiberglass/Ceramics
Color	Visual	-	White	White	White
Thickness	ASTM D374	mm	0.15	0.25	0.50
Density	ASTM D792	g/cm3	1.07	1.07	1.07
90° peeling adhesion	-	N/25mm	> 14.0	> 15.5	> 19.0
Adhesoin Strength	ASTM 7234	N/mm	> 1.5	> 1.7	> 2.0
Flammability Class	UL 94	-	V0	V0	V0
Thermal					
Thermal Conductivity	ASTM D5470	W/m.k	> 1.0	> 1.0	> 1.0
Thermal Impedance	ASTM D5470 @70psi	°C-in²/W	0.62	0.85	1.19
Temperature Resistance	ASTM D5470	°C	-20 TO 120	-20 TO 120	-20 TO 120
Electrical					
Dielectric Strength	ASTM D149	kV/mm	> 4.0	> 4.0	> 4.0
Volume Resistivity	ASTM D257	ohm-m	> 10 ¹²	> 10 ¹²	> 10 ¹²

- ### Application & Use Instructions
1. Prepare the Surface: Ensure that the surface where you'll be attaching THERMALTape® is clean, dry, and free of any dust, dirt, or grease. This is essential for a strong and lasting bond.
 2. Part preparation: remove the protective line on either side of THERMALTape®, exposing the adhesive.
 3. Alignment: Align the part to the target area

4. Apply pressure: After placing the THERMALTape® part onto the target surface, apply consistent pressure.
 5. Second liner: remove the protective liner from the top surface of THERMALTape® and apply it to the other target surface.
- without applying any pressure. This allows you to adjust the placement and make sure it's positioned correctly before committing to the adhesive bond.

6. Apply pressure: After placing the THERMALTape® part onto the second target surface, apply consistent pressure.
7. * Recommended attachment pressure: > 10psi or 0.07 N/mm².

Features

- Low Thermal Resistance
- High Compressibility
- Electrically Insulating
- RoHS, Reach and UL 94-V0 compliant

Delivery Format

- Sheets of 7.9" x 15.9"
- Die-cut parts
- Other formats upon request

COOLPad®

CONFORMABLE THERMAL GAP FILLERS AND PADS

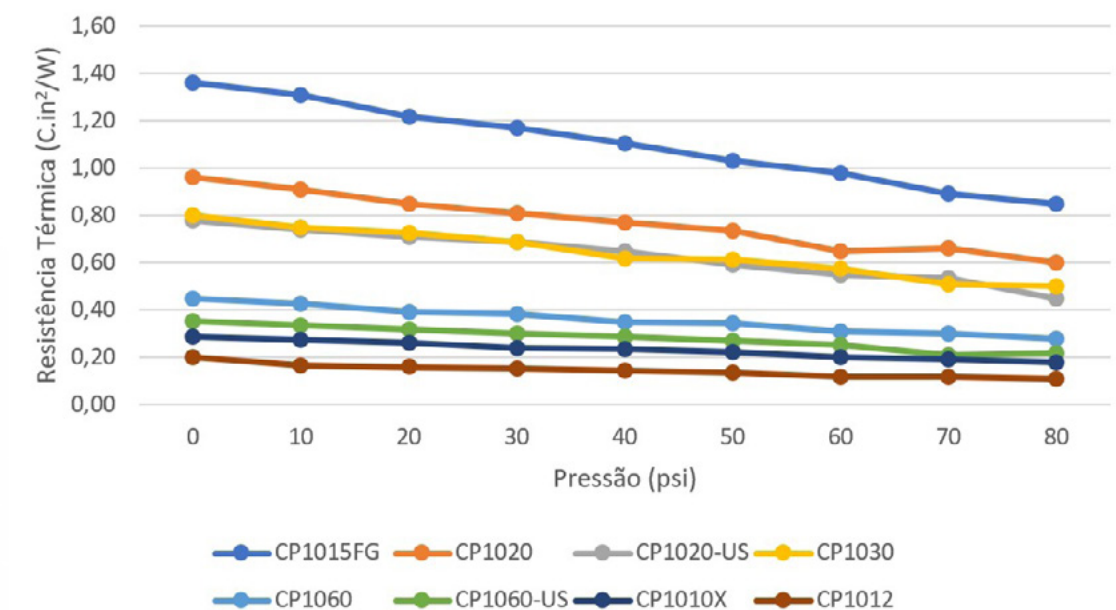
COOLPad® offers a range of advanced thermal interface pads, tailored to meet the the ever-evolving needs of the industry. Engineered for simplicity in application, they boast low thermal resistance and unparalleled adaptability to irregular or challenging surfaces.

The defining feature of COOLPad® is its high conformability, which ensures effective thermal coupling even with minimal clamping forces. This makes it particularly

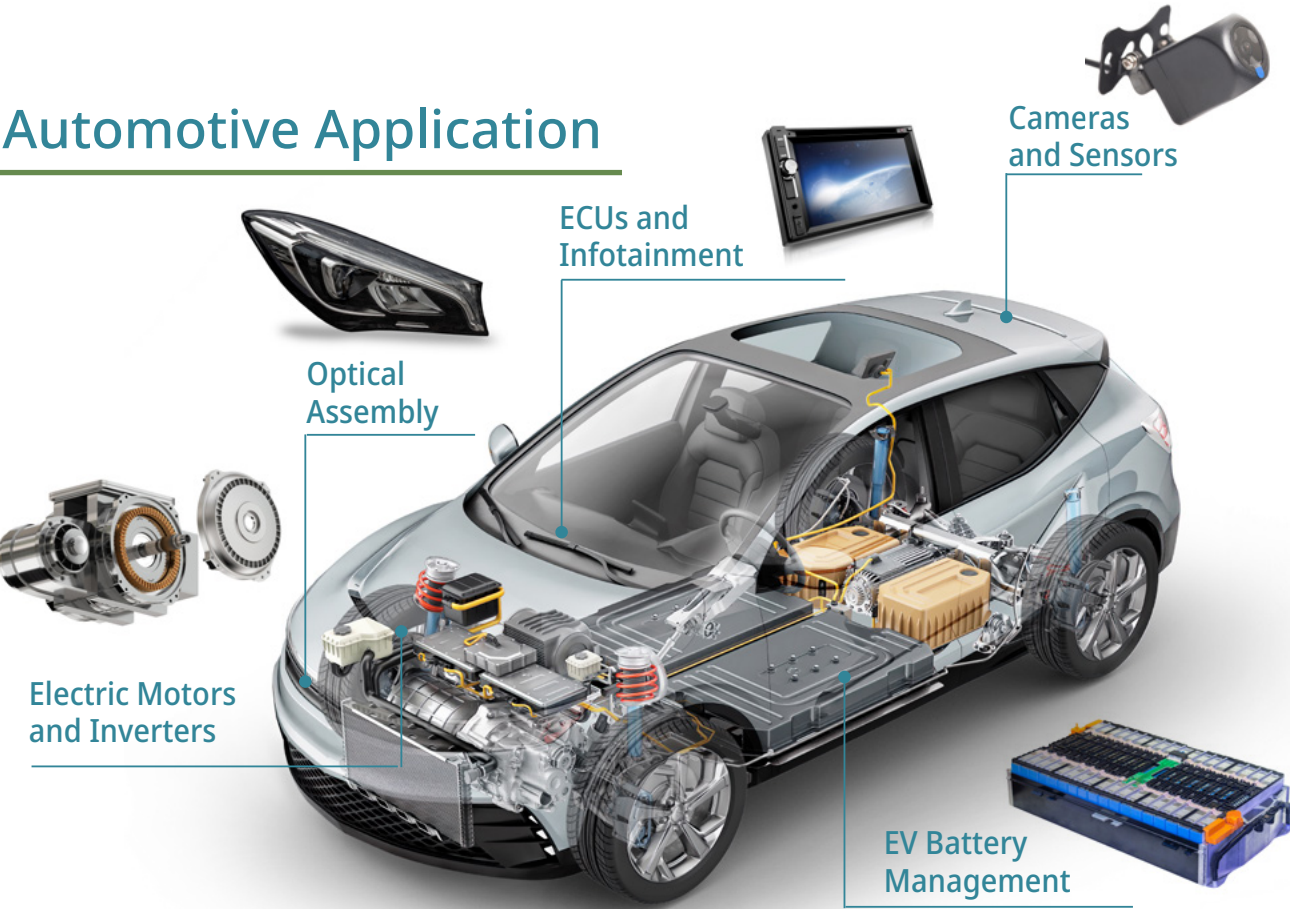
suitable for applications where the interface between heat-generating components and heat-dissipating surfaces requires a delicate balance of pressure and thermal efficiency.

Ideal for a variety of settings, COOLPad® delivers a perfect blend of simplicity, performance, and versatility in thermal management solutions.

Linha COOLPad
Resistência Térmica x Pressão



Automotive Application



Consumer Goods and Industrial Equipment

- LED lighting
- Cameras, laptops, tablets, and mobile devices
- IGBT modules and electronic components, such as MOSFETs, transistors, and semiconductors



Telecommunication Equipment

- Optical Transceivers
- Base Stations
- Servers
- Antennas and IoT Devices
- Infrastructure for 5G network

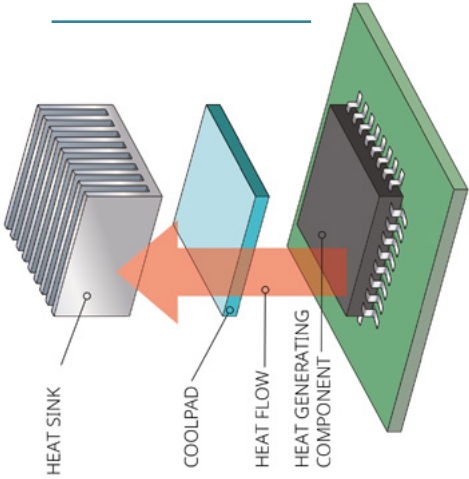


Properties	Standard	Unit	CP1015FG	CP1020	CP1020.US	CP1030	CP1060	CP1060-US	CP1010X	CP1012
Mechanical / Chemical										
Matrix	-	-	Silicone	Silicone	Silicone	Silicone	Silicone	Silicone	Silicone	Silicone
Thermal Conductive Filler	-	-	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Carbon
Support (mechanical reinforcement)	-	-	Fiberglass	-	-	-	-	-	-	-
Color*	Visual	-	Dark gray	Light blue	Light blue	Salmon	Salmon	Pink	Pink	Black
Shelf Life	-	years	5	5	5	5	5	5	5	5
Thicknesses**	ASTM D374	mm	0.23 - 5.00	0.5 - 10.0	0.5 - 10.0	0.5 - 10.0	0.5 - 10.0	0.5 - 10.0	0.5 - 10.0	0.5 - 10.0
Density	ASTM D792	g/cm³	2.30	2.73	2.73	3.10	3.24	2.30	3.10	2.76
Hardness	ASTM D2240	Shore 00	60	40	30	40	60	30	40	40
Outgassing, TML	ASTME595 Modificada	%	0.06	0.06	0.06	0.04	0.13	0.13	0.30	0.20
Flammability class	UL 94	-	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0
Thermal										
Thermal Conductivity	ASTM D5470	W/m.k	1.00	2.00	2.00	3.00	6.00	6.00	10.00	12.00
Volume Resistivity	ASTM D257	ohms-cm	3.1 x 10 ¹¹	3.5 x 10 ¹²	3.5 x 10 ¹²	4.7 x 10 ¹⁴	5.3 x 10 ¹³	6.7 x 10 ¹²	1.0 x 10 ¹³	500
Thermal Impedance	ASTM D5470 @70psi	°C-in²/W	0.85	0.60	0.50	0.50	0.28	0.22	0.18	0.11
Operating Temperature	ASTM D5470	°C	-60 to 200	-60 to 200	-60 to 200	-60 to 200	-60 to 200	-60 to 200	-60 to 200	-60 to 200
Electrical										
Dielectric Breakdown Voltage	ASTM D149	kV/mm	4.00	5.00	5.00	4.00	5.00	5.00	6.00	-
Dielectric Constant at @1MHZ	ASTM D150	-	6.33	6.33	6.33	7.43	14.50	14.50	7.70	-

*Color may vary between suppliers.
**Other thicknesses and properties available upon request.

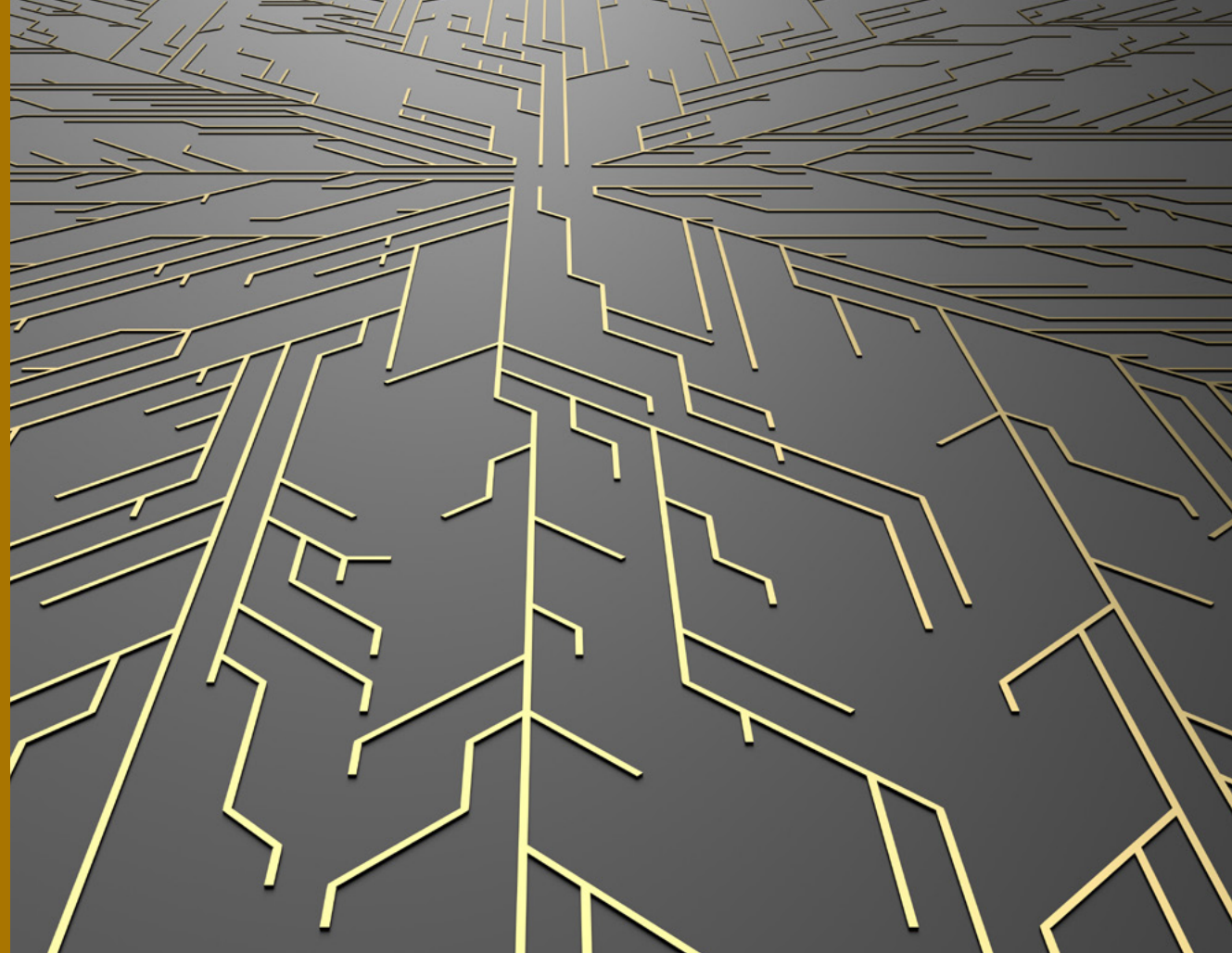
Application & Use Instructions

1. Prepare the surface: remove any dust, debris or residue from the contact surfaces. If necessary, use alcohol and a lint-free cloth.
2. Peel-off the liner: remove the protective film on one side of the COOLPad®.
3. Apply the COOLPad® to the component: carefully align the pad over the component, making sure it covers its entire surface. Apply even pressure to the pad, pressing it down firmly to ensure good contact.
4. Remove the remaining liner: carefully peel off the remaining protective film to expose the top surface of the COOLPad®.



Removal Instructions

1. Gently lift the COOLPad® using a plastic or non-abrasive tool, such as a plastic spudger, carefully lift one edge of the pad. Avoid using metal tools, as they can damage the component.
2. Remove the material: slowly peel the COOLPad® off the electronic component, applying gentle, even pressure. If the pad adhesive is firmly attached, you can use a heat gun to soften the material and make removal easier.
3. Clean the component: once the COOLPad® is removed, you may need to clean the component surface to remove any residue. You can use a lint-free cloth with isopropyl alcohol (IPA) to clean the component surface thoroughly.



COOLPhase[®]

PHASE CHANGE THERMAL PADS

The COOLPhase[®] series features high-performance polymer matrix materials, renowned for their exceptional wettability. This characteristic significantly reduces thermal contact resistance between heat-generating and heat-dissipating surfaces.

Uniquely designed to operate optimally at temperatures between 50°C and 60°C, COOLPhase[®] materials exhibit a transformative property. When softened within this temperature range, they naturally

flow to fill any air gaps, ensuring efficient thermal transfer. This process allows for exceptional long-term reliability, a key advantage over traditional thermal pastes that may degrade over time.

COOLPhase[®] sets a new standard in thermal management solutions, providing durability and effective heat transfer for a wide range of applications.

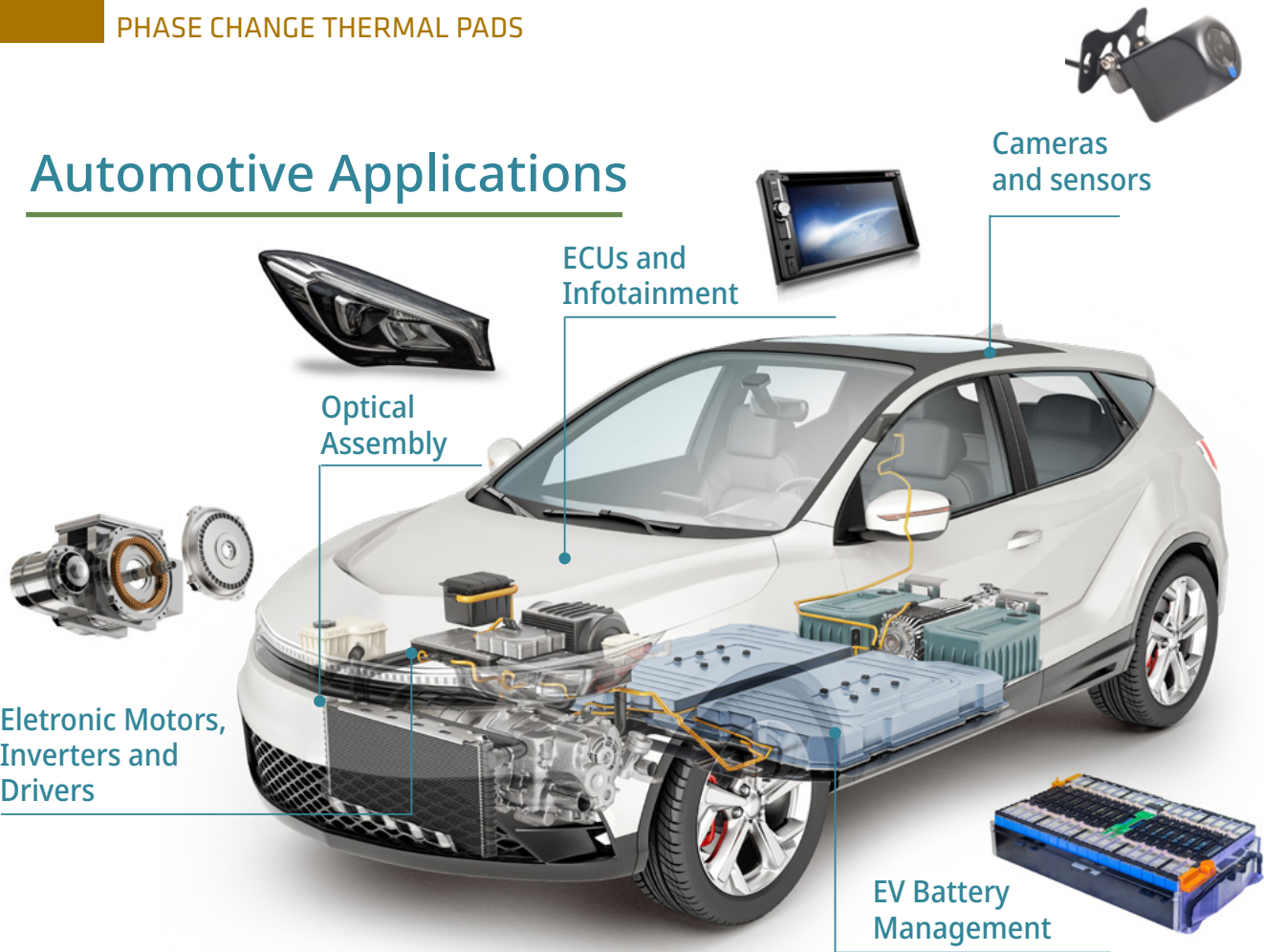
Features

- High-Thermal Conductivity
- Low Contact Resistance
- Easy to assemble
- RoHs and REACH compliant

Delivery Format

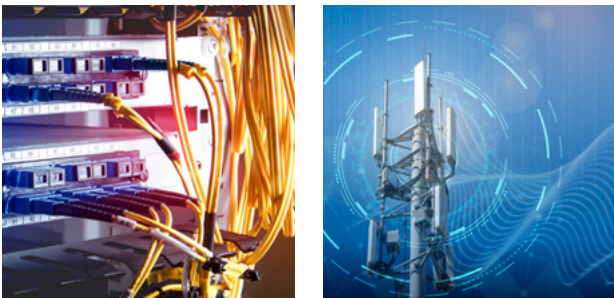
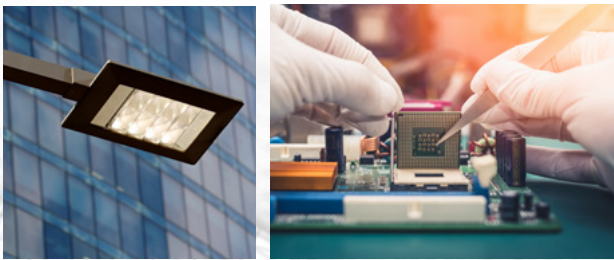
- Sheets of 7.9" x 15.9"
- Die-cut parts
- Other formats available upon request

Automotive Applications



Industrial and electronic equipment

- LED Lighting
- Cameras, Laptops, Tablets e Mobile devices
- IGBT modules and electronic components such as MOSFETs, Transistors and ICs



Telecommunications

- Optical Transceivers
- Base Stations
- Servers
- Antennas and IoT Devices
- Infrastructure for 5G networks

PROPERTIES	Standard	Unit	PH 1038	PH 1045	PH 1055
Mechanical / Mechanical					
Color	Visual	-	Grey	Grey	Grey
Shelf Life	-	years	2	2	2
Available Thicknesses	ASTM D374	mm	0.25 to 1.00	0.25 to 1.00	0.25 to 1.00
Density	ASTM D792	g/cm³	1.30	1.35	13.50
Phase Change Temperature	-	°C	50 to 60	50 to 60	50 to 60
Flammability Class	UL 94	-	V0	V0	V0
Thermal					
Thermal Conductivity	ASTM D5470	W/m.k	3.8	4.5	5.5
Volume Resistivity	ASTM D257	ohm-cm	3.0 x 10 ¹²	3.0 x 10 ¹²	3.0 x 10 ¹²
Thermal impedance	ASTM D5470 @70psi	°C-in²/W	0.13	0.20	0.55
Operating Temperature	ASTM D5470	°C	-45 to 125	-45 to 125	-45 to 125
Electrical					
Dielectric Strength	ASTM D149	kV/mm	3.00	4.00	4.00

*Other thicknesses and performance levels under request

Application & Use Instructions

1. Prepare the surface: remove any dust, debris or residue from the contact surfaces. If necessary, use alcohol and a lint-free cloth.
2. Peel-off the liner: remove the protective film on one side of the COOLPhase[®]
3. Apply the COOLPhase[®] to the component: carefully align the pad over the component, making sure it covers its entire surface. Apply

4. even pressure to the pad, pressing it down firmly to ensure good contact.
- Remove the remaining liner: carefully peel off the remaining protective film to expose the top surface of the COOLPhase[®]

Removal Instructions

1. Gently lift the COOLPhase[®]: using a plastic or non-abrasive tool, such as a plastic spudger, carefully lift one edge of the pad. Avoid using metal tools, as they can damage the component.
2. Peel off the pad: slowly peel off the COOLPhase[®] from the electronic component, using gentle and even pressure. If the pad is stuck firmly, you can use a little heat, such as from an hair dryer

- or a heat gun to soften the adhesive and make it easier to remove.
3. Clean the component: once the COOLPhase[®] is removed, you may need to clean the component surface to remove any residue. You can use a lint-free cloth with isopropyl alcohol (IPA) to clean the component surface thoroughly.

FORMAPad[®] GI-5100

GEL-TYPE THERMAL PAD

FORMAPad stands out as a specially formulated one-component material, providing superior thermal management solutions. Its excellence lies in its exceptional conformability and low contact resistance, ensuring efficient heat transfer.

Designed for ease of use in manufacturing, FORMAPad can be seamlessly dispensed both automatically and through serigraphic processes. This versatility greatly enhances its applicability in various production environments.

Moreover, FORMAPad is characterized by its remarkable mechanical stability, which it maintains across a range of ambient temperatures. This stability is complemented by high thermal conductivity, making it an ideal choice for applications requiring consistent thermal management under varying conditions.

FORMAPad is the optimal solution for industries seeking a reliable, easy-to-handle, and highly effective thermal management material.

Characteristics

- Ultra conformity to the irregularities of the contact surfaces
- Can be applied as a Thermal Paste, with or without a serigraphic process
- High Thermal Conductivity - 2.6W/mk
- Paste with good spreadability
- Possibility of application in layers thinner than 0.025mm

Delivery Format

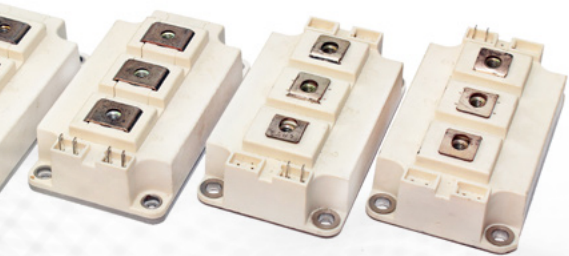
- 300cc cartridges
- 5 and 25 kg pails

FORMAPad® GI-5100

GEL-TYPE THERMAL PAD

Applications

- IGBT modules
- LED light fixtures
- Automotive Electronics
- Transistors, Diodes, CPUs



Properties	Standard	Unit	LG4000
Mechanical / Chemical			
Color	Visual	-	Grey
Shelf Life @25°C	-	years	5
Viscosity at 5rpm @25°C	Helipath	PaS	550
Density	ASTM D792	g/cm³	2.2
Thermal			
Thermal Conductivity	ASTM D5470	W/m.k	2.6
Thermal Impedance	ASTM D5470 @70psi	°C-in²/W	0.01
Operating Temperature	ASTM D5470	°C	-55 to +205
Electrical			
Breakdown Voltage	ASTM D149	kV/mm	2.8
Dielectric Constant @ 1kHz	ASTM D150	-	0.13
Volume Resistivity	ASTM D257	ohm-cm	> 10 ¹⁰
Flammability class	UL 94	-	V0

*During transport or after long periods of storage, the material may undergo phase separation, perform homogenization before use.

Application & Use Instructions

1. Ensure surfaces are clean and dry

Removal Instructions

1. Use a cloth moistened with isopropyl alcohol



LEDGlue® LG4000

THERMAL CONDUCTIVE SILICONE ADHESIVE

LEDGlue®, a silicon-based, mono-component thermal adhesive, sets a new standard in thermal management solutions. It's specially designed to provide superior thermal performance, characterized by low contact resistance and extended durability.

This thermally conductive adhesive is expertly formulated to enhance the longevity and efficiency of various applications, particularly in areas requiring robust thermal bonding. Its unique composition ensures consistent

performance over an extended period.

Additionally, LEDGlue® aligns with environmental and safety standards, being fully RoHS and Reach compliant. This adherence underscores its suitability for a wide range of industrial applications while maintaining a commitment to environmental responsibility.

Choose LEDGlue® for a high-quality, reliable, and eco-friendly thermal adhesive solution.

Features

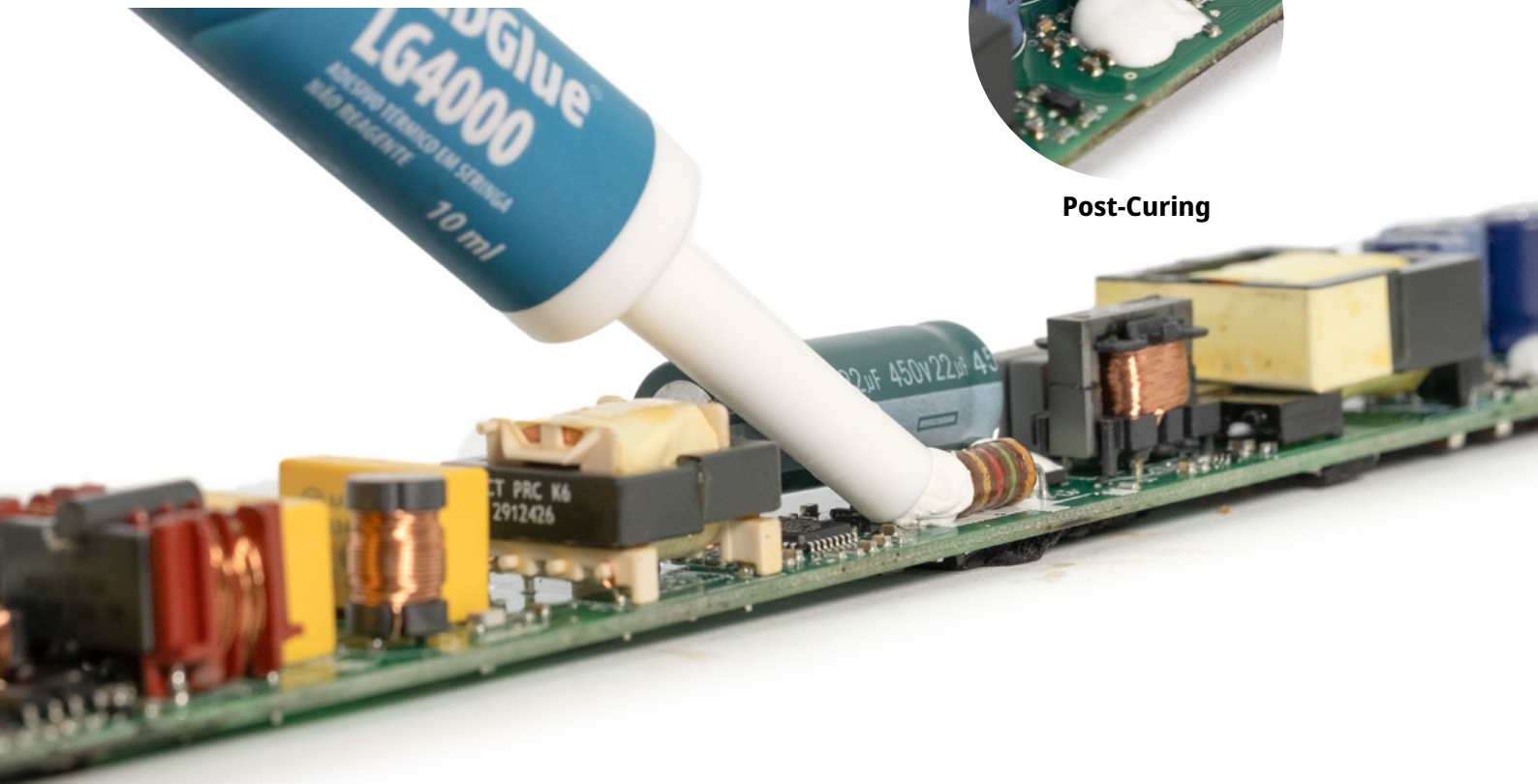
- Mono Component
- Easy application
- Reduced curing time
- Optimal adhesion strenght

Delivery Format

- 300cc cartridges

LEDGlue® LG4000

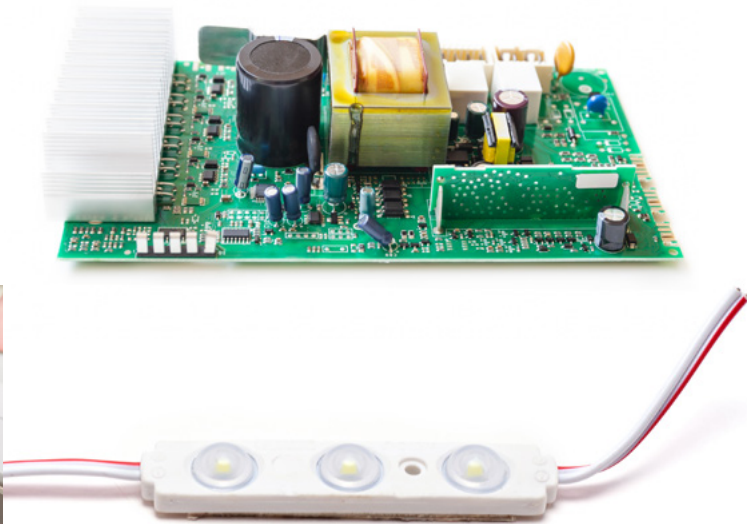
THERMAL CONDUCTIVE SILICONE ADHESIVE



Post-Curing

Applications

- PCBs and Heat Sinks
- LED Modules
- Sensors
- Electronic Components



Properties	Standard	Unit	LG4000
Before Curing (@ 25°C)			
Base Matrix	-	-	Silicone
Thermal Conductive Filler	-	-	Ceramic Fillers
Color	-	-	White
Viscosity	GB/T 10247-2008	mPa·s	Paste-like
Density	GB/T 13354-92	g/cm3	2.15±0.05
Tack Free Time	GB/T 13477.5-2002	minutes (25°C, 55%RH)	10 to 20
Total Curing Time	-	hours (25°C, 55%RH)	24
Shelf Life	-	months	12
After Curing (@ 25°C; 55% RH; 7d)			
Hardness	GB/T 531.1-2008	Shore A	35 to 45
Thermal Conductivity	GB/T 10297-1998	W/m.k	1
Coefficient of Thermal Expansion	GB/T 20673-2006	µm/(m.°C)	210
Water Absorption	GB/T 8810-2005	% (24h)	0.01 to 0.02
Flammability	UL 94	-	V0
Elongation Resistance	GB/T 528-2009	%	≥150
Tensile Strength	GB/T 528-2009	Mpa	≥1.5
Shear Resistance	GB/T 7124-2008	Mpa (Al/Al)	≥1.0
Dielectric Strength	GB/T 1693-2007	kV/mm	≥20
Loss Factor	GB/T 1693-2007	1 MHz	0.001
Dielectric Constant	GB/T 1693-2007	1 MHz	2.8
Volume Resistivity	GB/T1693-2007	DC500VQ.cm	2.00E + 14
Operating Temperature	ASTM D5470	°C	-60 to + 260

Application Instructions:

- 1 - Prepare the Surface: before applying the silicone, the surface should be clean and dry. Remove any residue, dirt, dust or grease. Clean the area thoroughly with a cloth, using isopropyl alcohol for rubbing.
- 2 - Cut the nozzle: Use a stylus to cut the tip of the nozzle at a 45-degree angle, or at an angle that facilitates the application. Smaller cuts produce thinner application cords.
- 3 - Load the tube: insert the silicone tube into an

- application gun. Gently squeeze the trigger until the material starts to come out of the nozzle.
- 4 - Start applying: hold the application gun at a 45-degrees angle to the surface. Slowly and firmly squeeze the trigger while moving the application nozzle in the desired pattern.
 - 5 - Curing time: Silicone needs 24 hours to cure and develop its maximum resistance. avoid disturbing the product before complete cure.

Removal Instructions:

Before curing: Use acetone >60% or industrial-grade thinner.

After curing: Use spatulas for mechanical removal.

TECHNICAL SEALANTS

FLUID MATERIALS

FlexCOAT® 42

FlexSEAL® 48

FlexCOAT[®] FC60

CONFORMAL COATING FOR LED LIGHTING

FlexCOAT is a transparent, eco-friendly acrylic-based conformal coating, offering high mechanical flexibility. Tailored specifically for LED lighting and electronics, it provides robust protection against moisture, dust, and other environmental contaminants.

This coating is designed for simplicity and efficiency in application, ensuring quick and hassle-free use in various settings.

Its high dielectric strength is a key feature, safeguarding applications from electrical discharges and the CORONA effect.

FlexCOAT is an ideal solution for those seeking reliable protection for electronics and LED components, combining ease of use with strong environmental and electrical resistance.

Features

- Protects LEDs and other electronic components from moisture, sea air, dust, oxidation, corrosion, rust, fungal attack, etc;
- Creates a film of high mechanical resistance on the surface of components and the printed circuit board;
- Does not affect LED light output;
- Reduces the failure rate in the field;
- Compatible with a wide range of surfaces;
- Allows for post-processing of soldered components;
- Includes UV marking for application control;

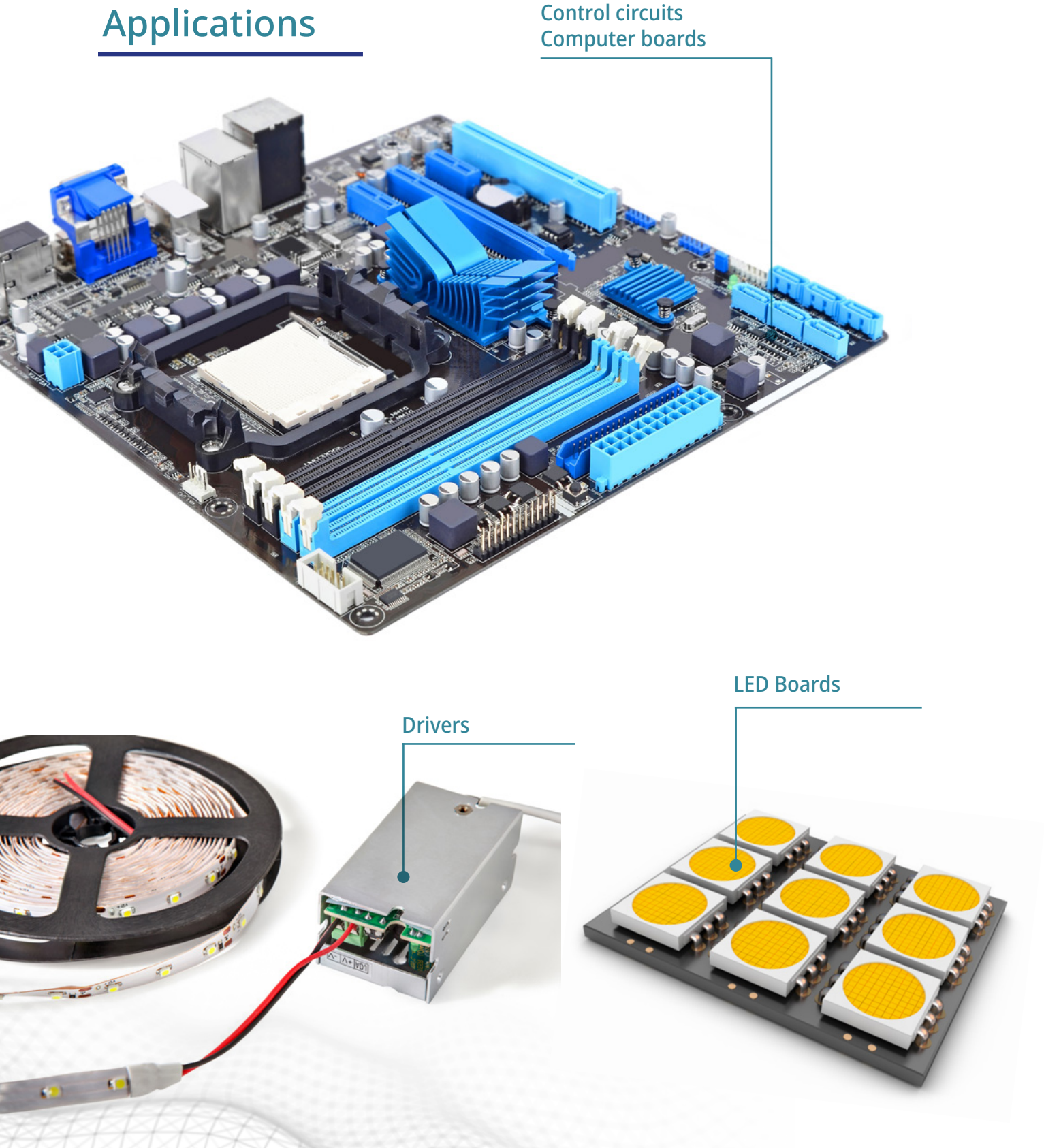
Delivery Format

- 1 liter bottles

Remarks:

1. It is the customer's responsibility to carry out the necessary tests for approval of the product in its final application, such as chemical compatibility tests and photometric tests.

Applications



Properties	Standard	Unit	FC60
Mechanical / Chemical (@ 25°C)			
Color	Visual	-	Transparent and glossy
Density	-	g/cm ³	0.916
Shelf Life	-	years	18
Curing Time			
Tack-free - Removable	-	minutes	8 to 10
Hard Cure (Suggested curing cycle)	-	hours	2
Accelerated curing oven time (@ 50°C)	-	minutes	15
Viscosity	Zahn Cup	seconds	60
Flammability Class	UL 94	-	V0
Coating thickness (single coat)	-	mm	0.035
Yield per liter (0.03mm film)	-	L/m ²	5.5
Thermal			
Thermal Conductivity	ASTM D5470	W/m.k	0.02
Insulation Resistance	ASTM D257	ohm-cm	3.5 x 10 ¹²
Operating Temperature	ASTM D5470	°C	-40 to 130
Electric			
Dielectric Strength	ASTM D149	kV/mm	15.00

Application & Use Instructions

- Steps for Application:**
- Site Preparation: Ensure the procedure is conducted in a well-ventilated area to avoid inhaling vapors and away from ignition sources due to its flammability. Also, ensure the work area is clean and free of dust.
 - Surface preparation:**
 - Clean the surface of the PCB or other components that will be varnished carefully with isopropyl alcohol to remove any dirt or solder residue.
 - Varnish Application:**
 - Can be applied using a brush, pneumatic spray gun or by dipping the component
 - Wear protective gloves to avoid direct contact with the varnish.
 - Use a brush or spray gun to apply a thin, even layer of varnish to the surface of the PCB, ensuring complete coverage of all areas, including the LEDs.

- Let the varnish dry according to the instructions.
- Second Layer (Optional):**
- If you want extra protection, you can apply a second layer of varnish after the first has completely dried. Make sure you follow the same application steps.
- Final Check:**
- After the varnish has completely dried, inspect the PCB to ensure that all areas are properly protected.
- Connect the PCB to the power supply and check if the LEDs work properly.
- Cleaning Tools:**
- Immediately clean the brushes or spray gun with a solvent recommended by the manufacturer to prevent the varnish from hardening on the tools.

Removal Instructions

FlexCOAT FC60 can be removed using an industrial grade thinner

Storage and Handling

- The product must be stored in a clean place, out of direct sunlight and at temperatures below 40°C
- The application must be carried out in a ventilated environment
- In liquid state, FlexCOAT is flammable
- Keep the product away from hot surfaces and fire
- Contact with skin and eyes causes irritation
- In case of contact, wash the affected areas with running water
- If irritation persists, seek medical attention
- For more information, consult the MSDS - MATERIAL SAFETY DATA SHEET.



FlexSEAL FS10010®

SILICONE ADHESIVE SEALANT

FlexSEAL FS10010® is a silicone-based adhesive that uniquely cures at ambient temperature, leveraging air moisture, eliminating the need for heat curing. This feature simplifies the application process, making it efficient and user-friendly.

Renowned for its excellent adhesion and sealing capabilities, FlexSEAL FS10010® ensures robust and reliable performance

in various applications. It provides exceptional protection, particularly in harsh operational environments, safeguarding against a range of external factors.

Ideal for situations demanding quick and effective sealing solutions, FlexSEAL FS10010® is a top choice for its ease of use, strong adhesion, and superior protection in challenging conditions.



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Features

- Offers excellent electrical insulation performance;
- Guards against moisture, dirt, and other atmospheric elements;
- Relieves mechanical stress and thermal shock brought on by vibration;
- Excellent service life of up to 20–30 years when aged outdoors
- The mechanical and electrical qualities remain steady within the temperature range of -20 to 140°C.
- Compatible with most LED diodes (no tarnishing)¹

Delivery Format

- 300cc and 2.600cc Cartridges
- Other packaging options under request

Remarks:

1. Before serial use, ensure that the product is chemically compatible with your application. For more information, check our guide below:
1. Suitable for use in automatic and semi-automatic dispensing systems.

Applications



- Sealing boxes and chassis of electronics industry products
- Cable glands
- Electrical connectors
- Lenses and light diffusers in LED fixtures

PROPERTIES	Standard	Unit	FS10010
Before curing			
Color	-	-	Black or Milky
Viscosity	GB/T 10247-2008	mPa·s (25°C)	250.000
Density	GB/T 13354-92	g/cm³ (25°C)	1.0 to 1.1
Tack free time	GB/T 13477.5-2002	minutes (25°C;55%RH)	3 to 8
Total curing time	-	hours (25°C;55%RH)	24
Shelf Life	-	months	12
After curing			
Hardness	GB/T 531.1-2008	Shore A	40 to 50
Thermal Conductivity	GB/T 10297-1998	W/m.k	0.4
Expansion Coefficient	GB/T 20673-2006	µm/(m.°C)	210
Water Absorption	GB/T 8810-2005	% (24h; 25°C)	0.01 to 0.02
Flame Class	UL 94	-	V0
Elongation at break	GB/T 528-1998	%	250
Tensile strength	GB 6328-86	Mpa	0.6
Shear strength	GB/T 1693-2007	Mpa (iron/iron)	1.6
Dielectric Strength	GB/T 1693-2007	kV/mm (25°C)	20.0
Loss factor	GB/T 1693-2007	1 MHz (25°C)	0.09
Dielectric constant	GB/T 1692-92	1 MHz (25°C)	2.9
Volume resistance	GB/T 1692-92	DC500VΩ·cm	2.00E +14
Operating Temperature	ASTM D5470	°C	-20 to + 140

Application & Use Instructions

- 1 - Prepare the Surface: before applying the sealant, ensure the surface is clean and dry. Remove any residue, dirt, dust or grease. Clean the area thoroughly with a cloth, using isopropyl alcohol for rubbing.
- 2 - Cut the nozzle: Use a stylus to cut the tip of the nozzle at an angle of 45 degrees, or at the angle that facilitates the application. Smaller cuts produce thinner application cords.
- 3 - Load the tube: insert the silicone sealant tube into an application gun. Squeeze the trigger gently

- until the material starts to come out of the nozzle.
- 4 - Start applying: hold the application gun at an angle of 45 degrees to the surface. Slowly and firmly squeeze the trigger as you move the application nozzle along the sealing area. Apply consistent pressure to create an even cord.
 - 5 - Remove the excess sealant: Wipe the excess with a cloth or spatula.
 - 6 - Curing time: The silicone sealant needs 24 hours to cure and develop its maximum resistance. Do not activate your electrical or electronic device before full cure.

Storage and Transportation

- The adhesive is non-toxic and non-hazardous.
- Avoid exposing the package to rain and sun
- Keep in the shade, in a cool and airy place
- Shelf-life: 12 months from the manufacturing date.

ENCAPSULATION AND SHIELDING

TWO-COMPONENT RESIN
POLICap 540 56



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POLICap 540

TRANSPARENT POLYURETHANE-BASED ENCAPSULATION RESIN

PoliCAP is an innovative bi-component 2K resin, expertly designed for encapsulating LEDs and electronic components. It stands out for its fast curing capability at room temperature, ensuring a smooth, aesthetically pleasing finish, and excellent thermal expansion properties.

The defining feature of PoliCAP is its exceptional transparency. This transparency maintains the intensity of the luminous flux emitted by

LEDs, making it an ideal choice for applications where light output is crucial. Furthermore, it provides robust protection for components under adverse operating conditions, ensuring both functionality and longevity.

Ideal for a range of electronic applications, PoliCAP combines quick curing, aesthetic quality, and outstanding transparency with effective protection, making it an optimal solution for LED encapsulation.

Features

- Excellent light transmission
- Flexibility to compensate for thermal expansion of printed circuits and components
- High Thermal Dissipation
- Guarantees IP69 protection level

Delivery Format

- 20L canisters
- 80L barrels
- 200L barrels

Remarks

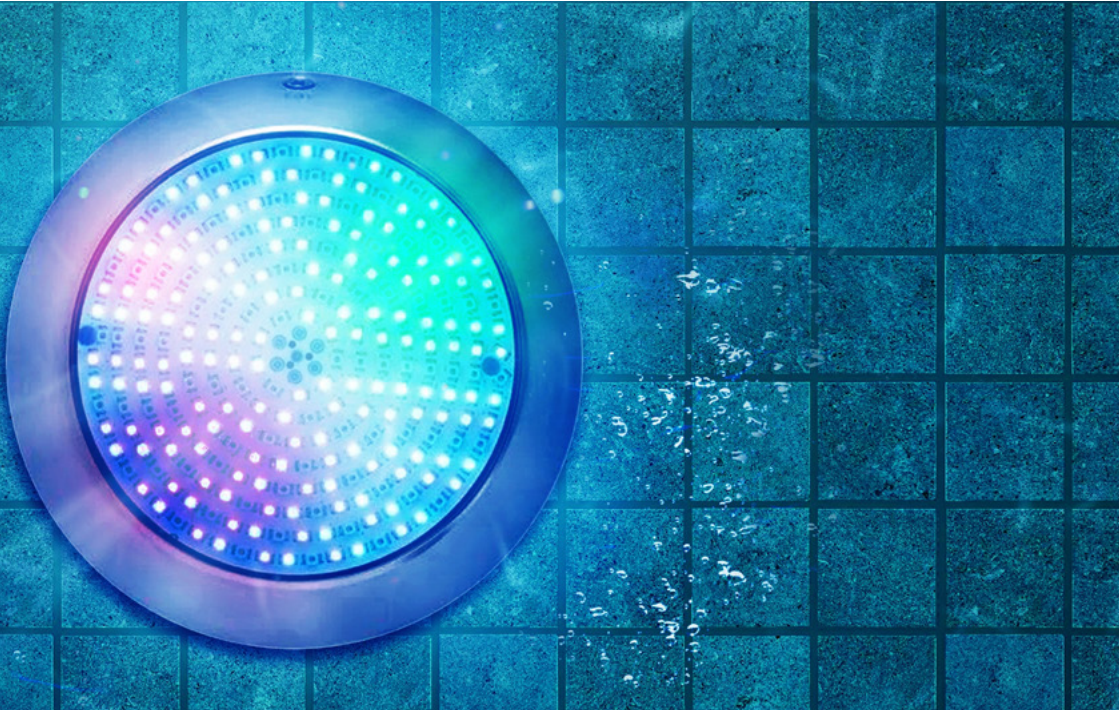
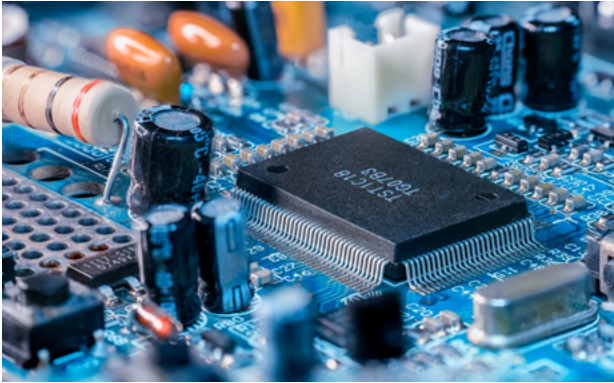
1. It is the customer's responsibility to carry out the necessary tests for approval of the product in its final application, such as chemical compatibility tests and photometric tests.

POLICap 540

TRANSPARENT POLYURETHANE-BASED ENCAPSULATION RESIN

Applications

- Internal and external lighting
- Underwater lighting
- Classified area lighting
- Headlights and beacon lamps
- Electronic equipment in general



PROPERTIES		Standart	Unit	POLICap 540	Endurecedor
Mechanical / Chemical (@ 25°C)					
Shelf-life (original packaging)		-	years	1	1
Color		Visual	-	Clear and Transparent	Clear and Transparent
Specific Gravity		ASTM D1475	g/ml	1.05 - 1.06	1.07 - 1.08
Viscosity		ISO 3219	mPas	250 - 650	150 - 450
Part by Volume (pbV)		-	mL	100/100	
Reactivity Data					
Gel time - 20q (*)		DIN 16945-16916	min	50 - 80	
Pot Life - 20q double initial viscosity (*)		STO4P15	min	10 - 12	
Curing Time					
Tack-free - removable (*) (**)		25°C 40% R.U.	hours	2 - 4	
Suggested curing cycle (**)		25°C 40% R.U.	hours	10 - 12	
Accelerated curing time (@ 50°C)		50°C <40% R.U.	min	15	
PROPERTIES OF CURED SYSTEM (***) (at 25°C)					
Density		ASTM D1475	g/ml	1.06	
Hardness		ASTM D2240	Shore D	20 - 26	
Glass Transition Temperature (DSC)		ASTM D3418	°C	5 - 15	
Linear Thermal Expansion (Tg-10°C) / (Tg+10°C)		DIN 53752	ppm/°C	80 / 210	
Refractive Index		Monochromatic light (633 nm)	-	1.51	
Transmission (2 mm layer)		Teste Interno	%	93	
Water Absorption - (1h100° / 7d23°)		DIN 53752	%	<0.8 / <0.5	
Tensile Strength		ISO 527	N/mm²	5 - 6	
Elongation at Break		ISO 527	%	400 - 500	
Flammability		UL 94	-	HB	
Thermal					
Thermal Conductivity		ISO 22007-2	W/m.k	0.25	
Operating Temperature (****)		IEC 600085	°C	-40 to 90	
Electric					
Dielectric Strength (50 Hz - 2 mm)		ASTM D149	kV/mm	20 - 25	
Volume Resistivity		ASTM D257	ohm-cm	1.4 x 10 ¹⁵	

(*) For larger quantities the values are shorter and the exothermic peak increases.
(**) The final curing cycle should be defined according to each specific customer application. Moreover, the curing time will be adapted to size and quantity.
(***) All mentioned information is based on results gained from experience and tests. We guarantee the accuracy of the data, but they are given without acceptance of liability for application and characteristics of finished products, depending on technology and working methods of final users.
(****) Performance and reliability can be negatively affected for some applications if values fall outside the indicated range.

Application & Use Instructions

1. Control the temperature of the application environment between 20°C - 25°C and relative humidity below 30%.
2. Application must be carried out in a well-ventilated environment.
3. Ensure that the surfaces on which the resin will be applied are completely clean and dry.
4. Manual application: In a clean container, pour the desired amount of resin (A) Performance and reliability can be negatively affected for some applications if values fall outside the indicated range.

Removal Instructions

- For cleaning before curing, acetone > 60% or industrial grade thinner can be used, after curing only mechanical removal is effective, using spatulas.

Storage and Handling

1. The product should be stored in a clean, dry place, out of direct sunlight, at temperatures below 40°C, hermetically sealed.
2. In its liquid state, Pol(Cap) is flammable.
3. Contact with skin and eyes causes irritation.

4. In case of contact, wash the affected areas with running water.
5. If irritation persists, seek medical attention.
6. For more information consult the MSDS.
7. Keep the product away from hot surfaces and fire.

SERVICES

CFD Thermal Simulations	64
LED Thermal Characterization Testing	66

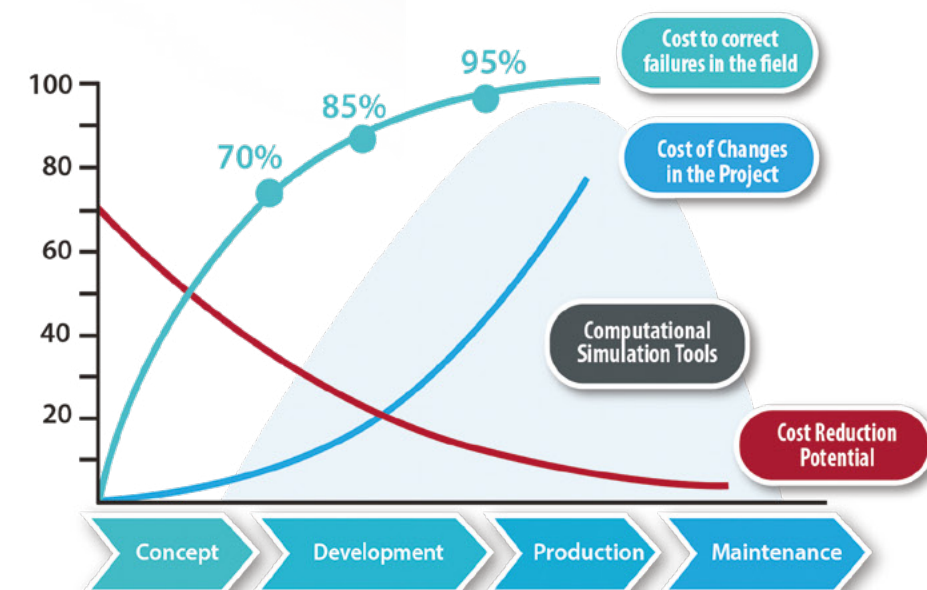
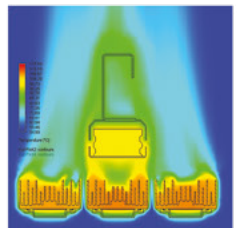
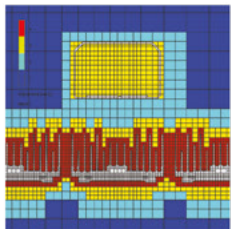
Computational Fluid Dynamics Simulations



Computational Fluid Dynamics Simulations

Celera is a complete partner in all stages of product development. We conduct Computational Fluid Dynamics Simulations to evaluate the performance of different design options and suggest design improvements when appropriate. Evaluating projects with computational simulations saves time, reduces material waste and can predict the behavior of lighting systems in various environmental conditions, including high temperatures.

The challenges	Our Solutions
High cost of prototype developments	By testing virtual 3D models, the high costs of producing physical prototypes are avoided
Difficult to test different materials or different designs	A computer model allows testing of different materials and designs easily
Long lead time for new products development	Computer simulations save time in the development phase and also generate more reliable products
Difficult to predict the behavior of the fixture in different climate and environmental conditions.	In virtual model tests, different climatic conditions are tested, generating data about the luminaire's performance in each environment.

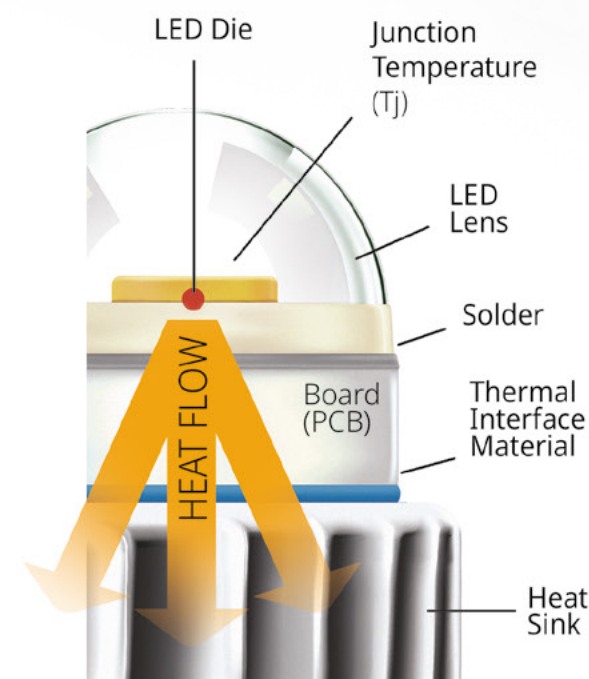


Font: Prof. Dr. Martin Eigner VPE TU Kaiserslautern

Thermal Characterization Tests of LEDs



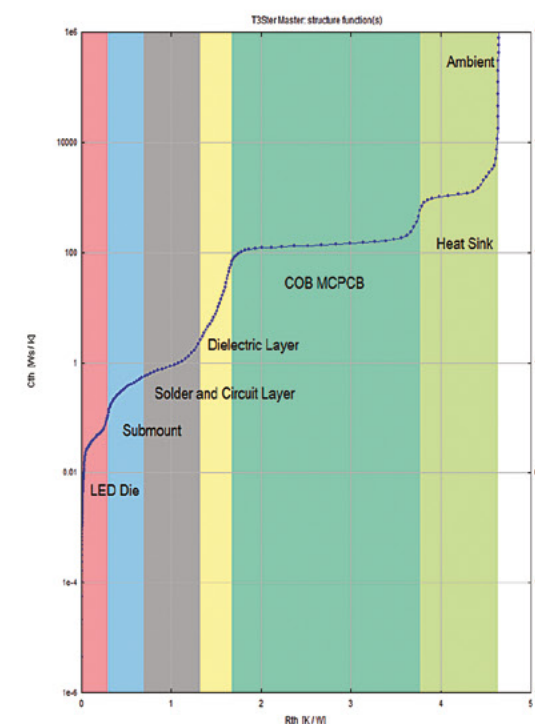
Thermal Characterization Tests of LEDs Including Junction Temperature (T_j) Direct Measurement



This test provides multi-domain modeling of LEDs, delivering highly precise values of their optical, electrical and thermal parameters.

The challenges Our Solutions

Obtaining accurate information about the temperature at the junction (T_j) of the LED	With the latest generation devices, Celera can perform precise measurement of the temperature at the junction (T_j) of the LED
Evaluation of quality and consistency in the soldering process to the PCB	Our tests enable us to check the quality of the welding processes by sampling
Evaluation of junction temperature (T_j) at different ambient temperature conditions (-20°C to 100°C)	Our equipment enables accurate temperature measurement in different thermal conditions of the environment (-20°C to 100°C)
Comparison of Expected Performance (data provided) with Actual Performance	Through precise measurements, it is possible to verify that the technical parameters provided are true to reality



Example of thermal resistance ratings (R_{th}) on the different components of an LED system

Celera also performs thermal characterization testing of a constructed prototype of the complete fixture. This test provides real operational data of how the product will perform during operation, enabling identification of potential weaknesses in the thermal system and calculating the true thermal interface resistance between components.

The challenges Our Solutions

Predict how components interact in real products and how this interaction may affect the performance and durability of luminaires	By testing complete fixtures, it is possible to accurately predict the behavior of the assembly in the field and prevent possible weak points
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[98%]

Performance

90%

99%

[Maintenance]

[Sending Data]

Performance

99%

95%

[Main]

[9]



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