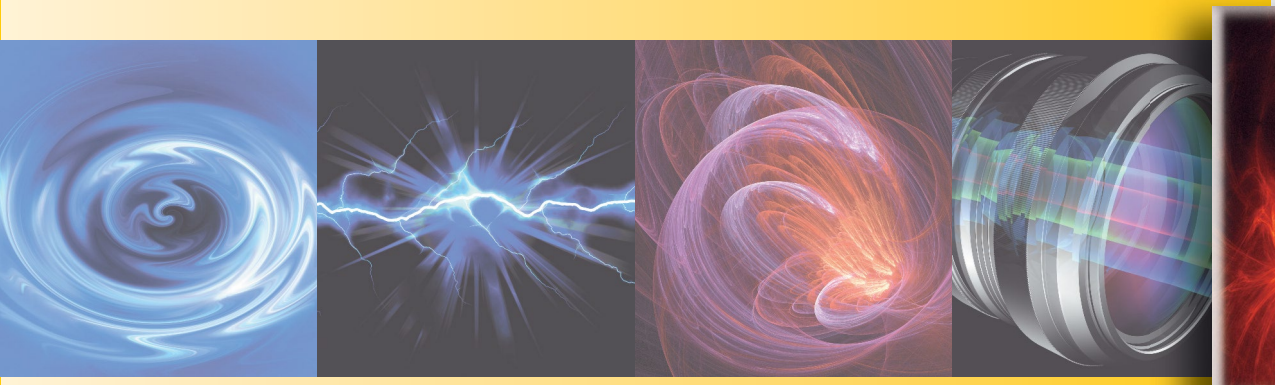
THERMAL INTERFACE MATERIALS



SEALING GASKETS

ELECTRICAL INSULATORS

EMI SHIELDING MATERIALS

OPTICAL FILTERS

THERMAL INTERFACE MATERIALS

FUTURA SRL

FUTURA SRL

OUR COMPANY

Founded in 1987, Futura is located south of Milan, Italy, and can supply customized heat management solutions. A reliable, precise and on time service, that we obtained also thanks to the introduction of new working machines, and the constant update of the internal professionalities, allowed Futura a constant increasing spare market and the possibility to acquire new customers also outside the borders of the internal market, in telecommunications, military, electromedical field and consumer electronics. Futura owns a high level know-how in the passive electronic components acquired during thirty years long activity and this is all benefit for our customers.

PRODUCTS AND SERVICE

We can offer a wide range of products to solve all heat management problems. In particular, we can offer complete solutions by using highly thermal, conductive interface materials, semiconductor clips, heatsinks, Peltier devices. We offer customized solutions in different fields such as power electronics, telecommunications, military devices and biomedical equipments. We can process different materials into predefined shapes or sizes for a wide range of applications. We can cut according to customer requirements all kinds of thermal conductive materials. We can produce complex shapes of any dimension with different machines:
Die-cutting machine
CNC oscillating knife cutting machine

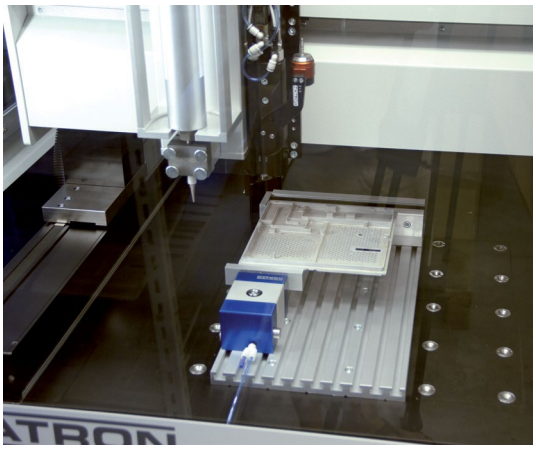
OUR CUSTOMERS

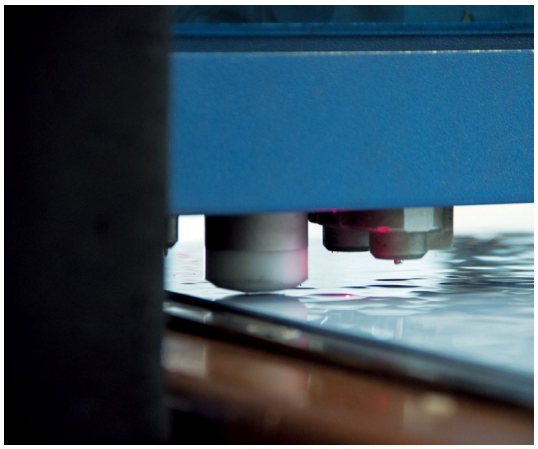
Our everyday philosophy is to establish with our customer long relationship to allow a constant technical support during the design and production of the final product. In this way the customer has the possibility to build up a product with the lower cost. Our staff can satisfy any kind of request from sampling to mass production with efficiency and cost saving.

Customer service in line with innovation and responsibility is the key to consider our customers as partners.
The key component of our success is the strong long term partnership with customers world wide.

QUALITY COMMITMENT

Our company has established and applies a Quality Management System according to ISO 9001:2008, by placing priority on improvement of customer satisfaction.





TECHNICAL INFORMATIONS

Our thermal management products are designed to provide an effective path for heat dissipation with minimal complication to the manufacturing process.
The thermal efficiency of an electronic system is related to the thermal performance of the three critical junctions of the system, and these junctions cannot be avoided in the system.
These junctions that influence the performance of a system are:

- From the die to the lead frame and package within a microprocessor.
- From the microprocessor to the heat sink.
- From the heat sink to the ambient environment.

The thermal resistance of the second junction can be reduced by effectively designing the thermal interface and providing optimum heat transfer between the component and the heat sink. The heat flow through a layer is given by the following formula:

$$H = \frac{dQ}{dT} = -kA \cdot \frac{dT}{dx}$$

Where "A" is the contact area, dT/dx the temperature variation through the layer and "k" is a parameter that defines the specific thermal conductivity of the material. In order to increase the heat transfer, we have to select a material with a high "k" value.
We can rewrite the formula in this way:

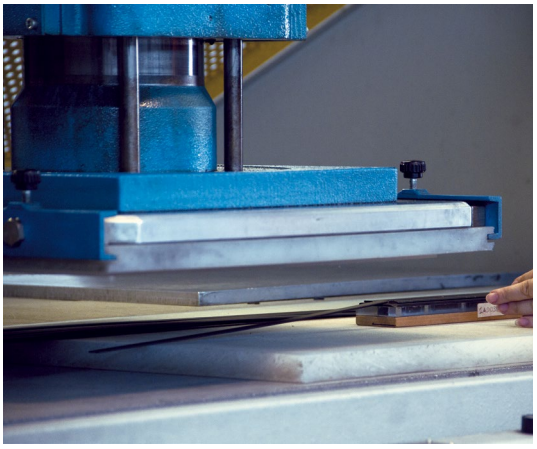
$$H = \frac{\Delta T}{R_{th}}$$

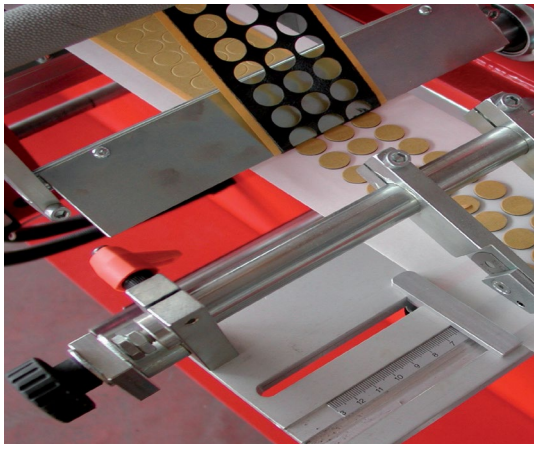
Rth is the thermal resistance and is generally given in °C/W.
Another factor on the heat transfer between two surfaces is the thermal contact resistance. In thermal transfer, air equals resistance. Thus contact resistance is a theoretical measure of the volume of air voids along the interface of any two surfaces. These microscopic voids are caused by surface roughness, surface concavity and other mechanical imperfections. These imperfections or "micro pores" impede the heat flow and increase the contact thermal resistance. The total thermal resistance of heat flow between two surfaces is:

Rth total = Rth material + Rth contact

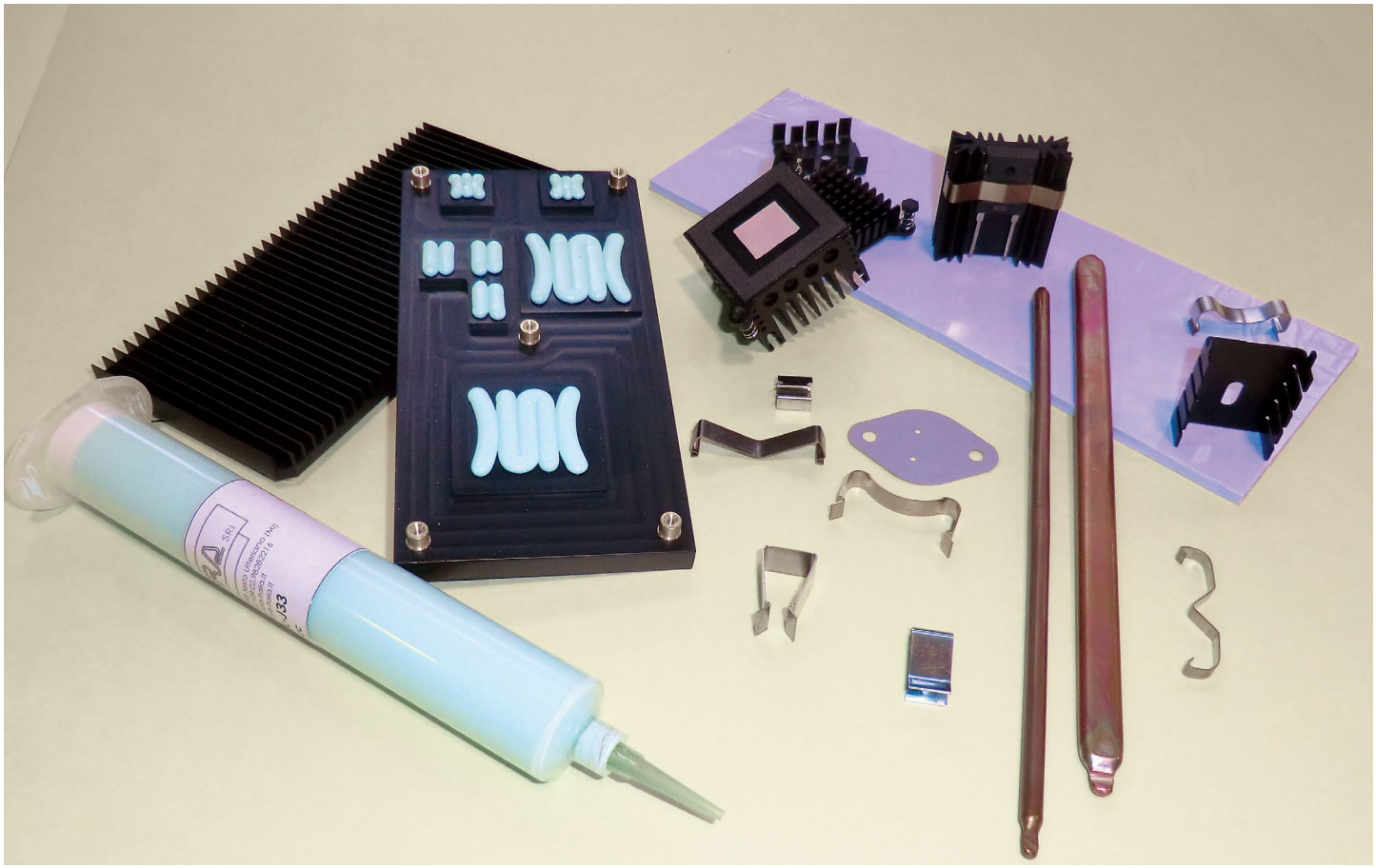
We have to introduce proper materials to minimize the thermal contact resistance. There are many thermally conductive insulating materials, like elastomers with thermally conductive fillers, polyimide films coated with thermally conductive materials, ceramic insulators, mica insulators.
The problems and time consuming process of applying thermally conductive grease made interesting the introduction of thermally conductive elastomers. When pressed, the thermally conductive elastomer adapts very well to the contact surface allowing to reduce the thermal contact resistance. The most common elastomer binding agent is silicone. To increase the thermal conductivity of silicone we use fillers like aluminium oxide or boron nitride. Sometimes the elastomer can be reinforced with fibreglass.
Other materials with good thermal properties are the phase change materials. Phase change materials reduce the thermal contact resistance by changing to soft state at a predetermined temperature. When this temperature is reached, the material expands its volume avoiding air voids.
Thermally conductive materials can be divided into:

- Electrically insulating materials (thermo-silicone interface materials and thermally conductive soft silicone interface materials).
- Electrically conductive materials.

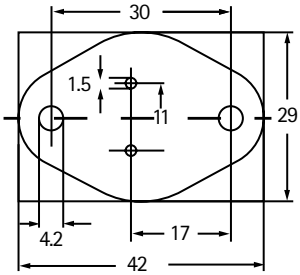




Futura offers a wide range of heatsinks, including custom solution.
We can study the right solution to minimize the thermal resistance in accordance with the customer's needs.
Requirements in terms of space and heat transfer.
To increase thermal transfer between component and heatsink, a thermal interface material can be added to the base of the heatsink. We can also dispense a thermal gel by using an automated machine. In this case precise quantity of thermal material can be dispensed to fill a defined area on a heat sink. Solutions with integrated heat-pipes can also be offered. So a complete solution can be realized: heat-sink with thermal material ready to be assembled by the customer. These pre-assembly solutions are properly packaged in order to protect the thermal material applied on the metal heat-sink.



Standard configurations and dimensions



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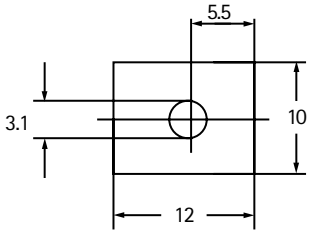

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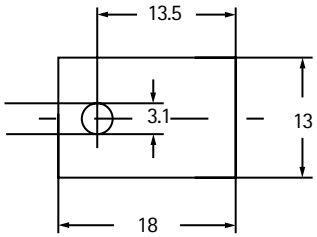

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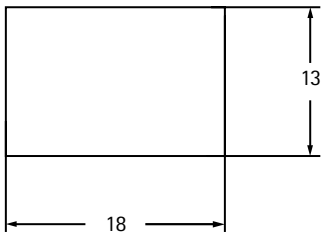

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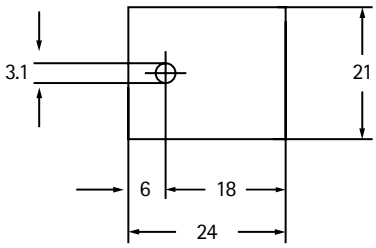

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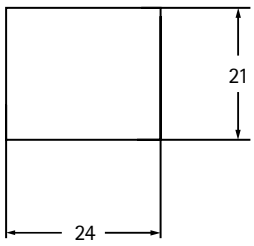

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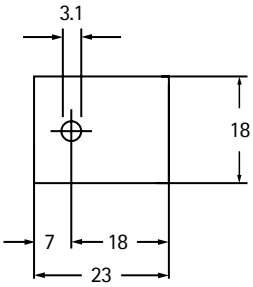

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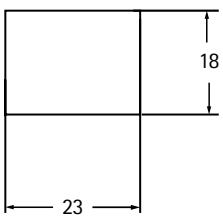

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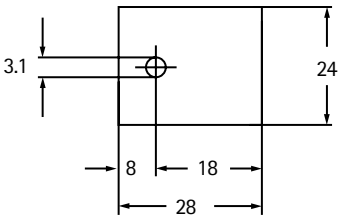

F264-1

Electrically insulating materials

In this category we can offer: thermo-silicone interface materials and thermally conductive soft silicone interface materials.

- **Thermo-silicone interface materials**
  These materials are ideal to substitute the use of mica and thermal grease. The thermal conductivity of silicone is enhanced through highly thermally conductive ceramics, like aluminiumoxide, boron-nitride.
  Thanks of its softness, silicone can cover the contact surface, minimizing the thermal contact resistance.
  The mechanical stability of the interface can be reinforced with fiberglass.
  The material can be used for:
  - Frequency converters
  - UPS
  - Telecommunications modules
  - Power supplies

- **Thermally conductive soft silicone interface materials**
  These material are soft and highly thermally conductive; they are filled with thermally conductive ceramics. These products can be used to fill gaps and enhance thermal performance of the electrical system.
  They can accommodate materials of different coefficients of thermal expansion with the compliant interface.
  Properties:
  - Filling areas of irregular surfaces to reduce the thermal contact resistance.
  - Electrically isolating components while providing good thermal transfer to heat sinks.
  - Heat transfer pads in memory modules.
  - Designed to allow easy die-cutting for simple, low cost application.

The pressure to be applied is very low, preventing the components, the board and the housing to be damaged.

Electrically non-insulating materials

Phase change materials

These materials are basically thin aluminium foils coated on both sides with a silicone free, thermally conductive polymer that at the phase change temperature expands its volume avoiding air voids.

Graphite material

It is a material with an extraordinary high thermal conductivity along length and width (x-y direction)

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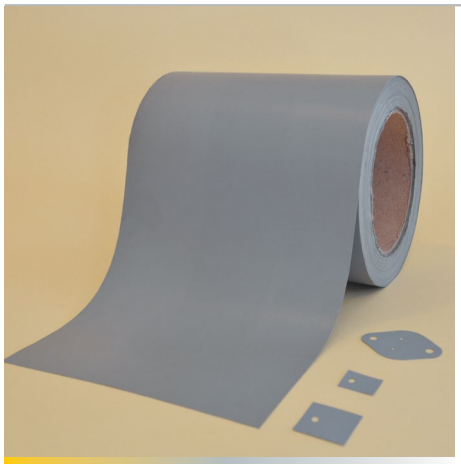


Thermal silicone pad
1,5 W/mK

TM-KCS is a fiberglass reinforced silicone foil filled with thermally conductive ceramics, hence its high thermal conductivity.
By its implementation a very low total thermal resistance can be achieved:
Its performance and flexibility make it the ideal interface material for most applications.

PROPERTIES

Good thermal conductivity
Low thermal resistance
Fiberglass reinforced
Very flexible
Clean and easy mounting with high process reliability
Electrically insulating

AVAILABILITY

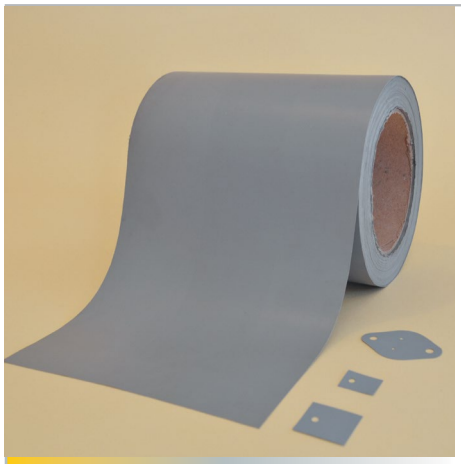
Roll form 300mm. Width x 50mt.
No adhesive
With adhesive (/A)
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM			
		TM-KCS230	TM-KCS300	TM-KCS450	TM-KCS800
Thickness	mm	0,23	0,30	0,45	0,80
Hardness	Shore A	85	85	85	85
Thermal Resistance @150 psi	°C-inch/W	0,28	0,36	0,54	0,78
Thermal Conductivity	W/mK	1,5	1,5	1,5	1,5
Breakdown Voltage	V (AC)	3000	4000	5000	8000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0

Material	Ceramic filled silicone
Reinforcement	Fiberglass
Colour	Grey

TM-TIF



Thermal silicone pad
2,0 W/mK

TM-TIF is a fiberglass reinforced silicone foil filled with thermally conductive ceramics, hence its high thermal conductivity.
By its implementation a very low total thermal resistance can be achieved.
Its performance and flexibility make it the ideal interface material for most applications.

PROPERTIES

Good thermal conductivity
Low thermal resistance
Fiberglass reinforced
Very flexible
Clean and easy mounting with high process reliability
Electrically insulating

AVAILABILITY

Roll form 300mm. Width x 50mt.
No adhesive
With adhesive (/A)
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM		
		TM-TIF200	TM-TIF300	TM-TIF450
Thickness	mm	0,20	0,30	0,45
Hardness	Shore A	85	85	85
Thermal Resistance @150 psi	°C-inch/W	0,30	0,38	0,49
Thermal Conductivity	W/mK	2,0	2,0	2,0
Breakdown Voltage	V (AC)	4000	6000	9000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0

Material	Ceramic filled silicone
Reinforcement	Fiberglass
Colour	Grey

TM-TIFX

Thermal silicone pad
5,0 W/mK

TM-TIFX is a fiberglass reinforced silicone foil filled with thermally conductive ceramics, hence its very high thermal conductivity.
By its implementation a very low total thermal resistance can be achieved.
Its performance and flexibility make it the ideal interface material for most applications.

PROPERTIES

High thermal conductivity
Low thermal resistance
Fiberglass reinforced
Very flexible
Clean and easy mounting with high process reliability
Electrically insulating

AVAILABILITY

Sheet 440 x 510 mm.
No adhesive
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM			
		TM-TIFX200	TM-TIFX300	TM-TIFX450	TM-TIFX800
Thickness	mm	0,20	0,30	0,45	0,80
Hardness	Shore A	80	80	80	80
Thermal Resistance @150 psi	°C-inch/W	0,12	0,16	0,19	0,30
Thermal Conductivity	W/mK	5	5	5	5
Breakdown Voltage	V (AC)	3000	6000	9000	>10000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0

Material	Ceramic filled silicone
Reinforcement	Fiberglass
Colour	White

TM-KM015

Thermal silicone pad
1,3 W/mK

TM-KM015 is high performance, elastomeric insulating material with the special polyester.
It's widely used in electronic appliances industry, because of its good thermal conductivity, insulation and convenient assembly.

AVAILABILITY

Roll form 300mm X 75mt.
With adhesive (/A)
Customized roll
Customized sheet
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM
		TM-KM015
Thickness	mm	0,15
Hardness	Shore A	75
Thermal Resistance @50 psi	°C-inch/W	0,41
Thermal Conductivity	W/mK	1,3
Breakdown Voltage	V (AC)	7000
Operating Temperature	°C	-50 to +200
Flame Rating		V0

Material	Elastomeric insulating material with polyester
Colour	Yellow

TM-KCP1-20

Very soft silicone
thermal pad coated
with fiberglass
1,0 W/mK
20 SHORE 00

TM-KCP1-20 is a very soft silicone and thermal conductive pad. It is coated with fiberglass reinforced product. Fiberglass reinforcement allows high tensile strength for improved handling and processing.
The product can be used as a filler between machine's contact interface.

PROPERTIES

Very low hardness
Electrically insulating
Fiberglass coated

AVAILABILITY

Sheet 200 x 400mm.
Naturally tacky one side
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM				
		TM-KCP1-20-100	TM-KCP1-20-200	TM-KCP1-20-300	TM-KCP1-20-400	TM-KCP1-20-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	20	20	20	20	20
Thermal Resistance @5 psi	°C-inch/W	1,1	1,7	2,5	2,9	3,4
Thermal Conductivity	W/mK	1,0	1,0	1,0	1,0	1,0
Breakdown Voltage	V (AC)	6000	6000	6000	6000	6000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have also the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5mm.

Material	Ceramic filled silicone
Reinforcement	Coated with fiberglass
Colour	Grey + pink

TM-KCP1-30

Soft silicone
thermal pad coated
with fiberglass
1 W/mK
30 SHORE 00

TM-KCP1-30 is a soft silicone and thermal conductive pad. It is coated with fiberglass reinforced product.
Fiberglass reinforcement allows high tensile strength for improved handling and processing.
The product can be used as a filler between machine's contact interface.

PROPERTIES

Low hardness
Electrically insulating
Fiberglass coated

AVAILABILITY

Sheet 200 x 400mm.
Naturally tacky one side
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM				
		TM-KCP1-30-100	TM-KCP1-30-200	TM-KCP1-30-300	TM-KCP1-30-400	TM-KCP1-30-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	30	30	30	30	30
Thermal Resistance @5 psi	°C-inch/W	1,2	1,8	2,6	3	3,5
Thermal Conductivity	W/mK	1,0	1,0	1,0	1,0	1,0
Breakdown Voltage	V (AC)	6000	6000	6000	6000	6000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible have also the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Reinforcement	Coated with fiberglass
Colour	Grey + pink

TM-KCP2-30

Soft silicone
thermal pad coated
with fiberglass
2 W/mK
30 SHORE 00

TM-KCP2-30 is a soft silicone and thermal conductive pad. It is coated with fiberglass reinforced product.
Fiberglass reinforcement allows high tensile strength for improved handling and processing.
The product can be used as a filler between machine's contact interface.

PROPERTIES

Low hardness
Electrically insulating
Fiberglass coated

AVAILABILITY

Sheet 200 x 400mm.
Naturally tacky one side
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM				
		TM-KCP2-30-100	TM-KCP2-30-200	TM-KCP2-30-300	TM-KCP2-30-400	TM-KCP2-30-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	30	30	30	30	30
Thermal Resistance @5 psi	°C-inch/W	1,0	1,6	2,3	2,8	3,2
Thermal Conductivity	W/mK	2,0	2,0	2,0	2,0	2,0
Breakdown Voltage	V (AC)	6000	6000	6000	6000	6000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible have also the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Reinforcement	Coated with fiberglass
Colour	Grey + pink

TM-KHC2-5

Ultra soft silicone
thermal pad
2,5 W/mK
5 SHORE 00

TM-KHC2-5 is an ultra soft silicone interface material, with a good thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surfaces thus filling gaps at very low pressure.

PROPERTIES

Good thermal conductivity
Very low hardness
Electrically insulating

AVAILABILITY

Sheet 200 x 400mm.
Naturally tacky both sides
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM				
		TM-KHC2-5-100	TM-KHC2-5-200	TM-KHC2-5-300	TM-KHC2-5-400	TM-KHC2-5-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	5	5	5	5	5
Thermal Resistance @5 psi	°C-inch/W	0,6	0,9	1,3	1,7	2,2
Thermal Conductivity	W/mK	2,5	2,5	2,5	2,5	2,5
Breakdown Voltage	V (AC)	6000	6000	6000	6000	6000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5mm.

Material	Ceramic filled silicone
Colour	Grey

TM-KHC2-15

Very soft silicone
thermal pad
2,5 W/mK
15 SHORE 00

TM-KHC2-15 is a very soft silicone interface material, with a good thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surfaces thus filling gaps at very low pressure.

PROPERTIES

Good thermal conductivity
Very low hardness
Electrically insulating

AVAILABILITY

Sheet 200 x 400mm.
Naturally tacky both sides
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM				
		TM-KHC2-15-100	TM-KHC2-15-200	TM-KHC2-15-300	TM-KHC2-15-400	TM-KHC2-15-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	15	15	15	15	15
Thermal Resistance @5 psi	°C-inch/W	0,6	0,9	1,3	1,7	2,2
Thermal Conductivity	W/mK	2,5	2,5	2,5	2,5	2,5
Breakdown Voltage	V (AC)	6000	6000	6000	6000	6000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5mm.

Material	Ceramic filled silicone
Colour	Grey

TM-KHC2-40

TM-KHC2-40 is a soft silicone interface material, with a good thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surfaces thus filling gaps at low pressure.

Soft silicone thermal pad
2,5 W/mK
40 SHORE 00

PROPERTIES

Good thermal conductivity
Low hardness
Electrically insulating

AVAILABILITY

Sheet 200 x 400mm.
Naturally tacky both sides
Cut according to customer specifications

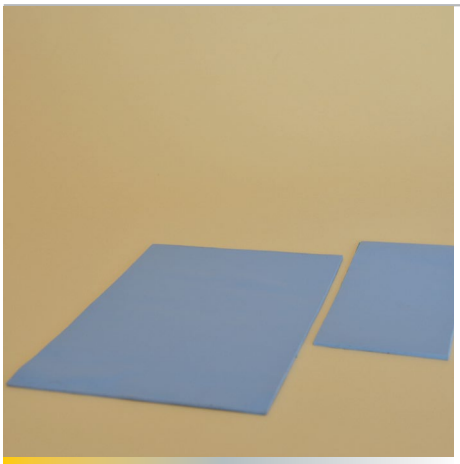
TECHNICAL DATA

	UNIT	ITEM				
		TM-KHC2-40-100	TM-KHC2-40-200	TM-KHC2-40-300	TM-KHC2-40-400	TM-KHC2-40-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	40	40	40	40	40
Thermal Resistance @5 psi	°C-inch/W	0,7	1	1,4	1,8	2,3
Thermal Conductivity	W/mK	2,5	2,5	2,5	2,5	2,5
Breakdown Voltage	V (AC)	6000	6000	6000	6000	6000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have also the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5mm.

Material	Ceramic filled silicone
Colour	Grey

TM-KCC3-25



Very soft silicone
Thermal Pad
3 W/mK
25 SHORE 00

TM-KCC3-25 is a very soft silicone interface material, with a good thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surfaces thus filling gaps at low pressure.

PROPERTIES

Good thermal conductivity
Low hardness
Electrically insulating

AVAILABILITY

Sheet 200 x 400mm.
Naturally tacky both sides
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM				
		TM-KCC3-25-100	TM-KCC3-25-200	TM-KCC3-25-300	TM-KCC3-25-400	TM-KCC3-25-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	40	40	40	40	40
Thermal Resistance @5 psi	°C-inch/W	0,6	1	1,4	1,8	2,1
Thermal Conductivity	W/mK	3	3	3	3	3
Breakdown Voltage	V (AC)	>5000	>5000	>5000	>5000	>5000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible have also the thicknesses 0,25 / 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Colour	Blue

TM-KCC3-40

Soft silicone
thermal pad
3 W/mK
40 SHORE 00

TM-KCC3-40 is a soft silicone interface material, with a good thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surface thus filling gaps at low pressure.

PROPERTIES

Good thermal conductivity
Low hardness
Electrically insulating

AVAILABILITY

Sheet 200 x 400mm.
Naturally tacky both sides
Cut according to customer specifications

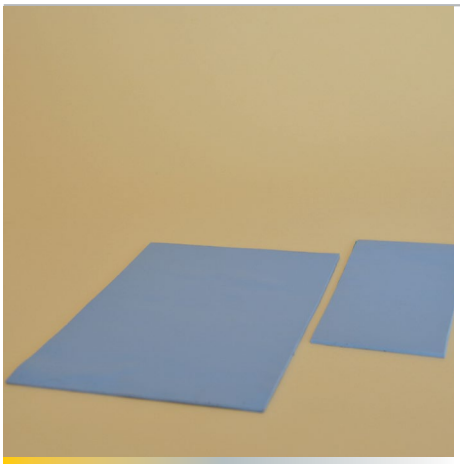
TECHNICAL DATA

	UNIT	ITEM				
		TM-KCC3-40-100	TM-KCC3-40-200	TM-KCC3-40-300	TM-KCC3-40-400	TM-KCC3-40-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	40	40	40	40	40
Thermal Resistance @5 psi	°C-inch/W	0,6	1	1,4	1,8	2,1
Thermal Conductivity	W/mK	3	3	3	3	3
Breakdown Voltage	V (AC)	>5000	>5000	>5000	>5000	>5000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible have also the thicknesses 0,25 / 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Colour	Blue

TM-KHC5-5



Ultra soft silicone
thermal pad
5 W/mK
5 SHORE 00

TM-KHC5-5 is a ultra soft silicone interface material, with a high thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surfaces thus filling gaps at low pressure.

PROPERTIES

High thermal conductivity
Ultra low hardeness
Electrically insulating

AVAILABILITY

Sheet 200 x 400mm.
Naturally tacky both sides
Cut according to customer specifications

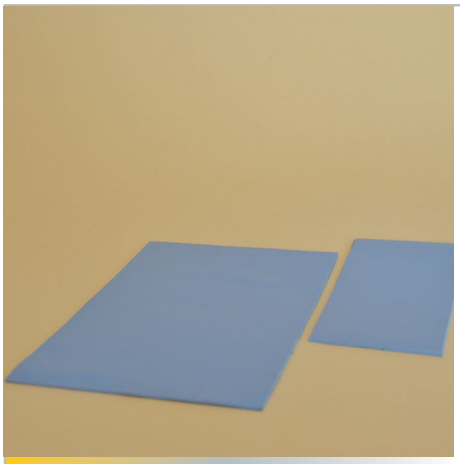
TECHNICAL DATA

	UNIT	ITEM				
		TM-KHC5-5-100	TM-KHC5-5-200	TM-KHC5-5-300	TM-KHC5-5-400	TM-KHC5-5-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	5	5	5	5	5
Thermal Resistance @5 psi	°C-inch/W	0,4	0,8	1,2	1,7	2,2
Thermal Conductivity	W/mK	5	5	5	5	5
Breakdown Voltage	V (AC)	>5000	>5000	>5000	>5000	>5000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Colour	Blue

TM-KHC5-15



TM-KHC5-15 is a very soft silicone interface material, with a high thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surfaces thus filling gaps at low pressure.

Very soft silicone
thermal pad
5 W/mK
15 SHORE 00

PROPERTIES

High thermal conductivity
Low hardness
Electrically insulating

AVAILABILITY

Sheet 200x 400 mm.
Naturally tacky both sides
Cut according to customer specifications

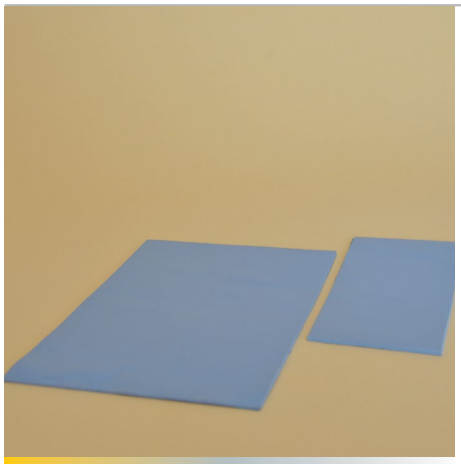
TECHNICAL DATA

	UNIT	ITEM				
		TM-KHC5-15-100	TM-KHC5-15-200	TM-KHC5-15-300	TM-KHC5-15-400	TM-KHC5-15-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	15	15	15	15	15
Thermal Resistance @5 psi	°C-inch/W	0,4	0,8	1,2	1,7	2,2
Thermal Conductivity	W/mK	5	5	5	5	5
Breakdown Voltage	V (AC)	>5000	>5000	>5000	>5000	>5000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Colour	Blue

TM-KHC5-40



Soft silicone
thermal pad
5 W/mK
40 SHORE 00

TM-KHC5-40 is a soft silicone interface material, with a high thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surfaces thus filling gaps at low pressure.

PROPERTIES

High thermal conductivity
Low hardness
Electrically insulating

AVAILABILITY

Sheet 220 x 400mm.
Naturally tacky both sides
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM				
		TM-KHC5-40-100	TM-KHC5-40-200	TM-KHC5-40-300	TM-KHC5-40-400	TM-KHC5-40-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	40	40	40	40	40
Thermal Resistance @5 psi	°C-inch/W	0,5	0,9	1,3	1,8	2,3
Thermal Conductivity	W/mK	5	5	5	5	5
Breakdown Voltage	V (AC)	>5000	>5000	>5000	>5000	>5000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Colour	Blue

TM-KHC6-25

Very soft silicone
thermal pad
6,0 W/mK
25 SHORE 00

TM-KHC6-25 is a very soft silicone interface material, with a high thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surfaces thus filling gaps at low pressure.

PROPERTIES

High thermal conductivity
Low hardness
Electrically insulating

AVAILABILITY

Sheet 200x400 mm.
Naturally tacky both sides
Cut according to customer specifications

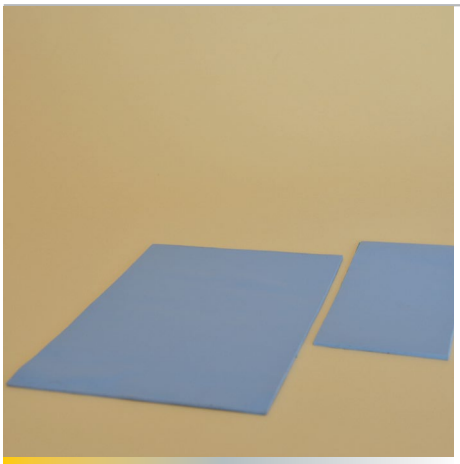
TECHNICAL DATA

	UNIT	ITEM				
		TM-KHC6-25-100	TM-KHC6-25-200	TM-KHC6-25-300	TM-KHC6-25-400	TM-KHC6-25-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	40	40	40	40	40
Thermal Resistance @5 psi	°C-inch/W	0,35	0,7	1	1,3	1,7
Thermal Conductivity	W/mK	6,0	6,0	6,0	6,0	6,0
Breakdown Voltage	V (AC)	>5000	>5000	>5000	>5000	>5000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Colour	Blue

TM-KHC6-40



Soft silicone
thermal pad
6,0 W/mK
40 SHORE 00

TM-KHC6-40 is a soft silicone interface material, with a high thermal conductivity and very high dielectric strength.
Through its high softness and flexibility, the material perfectly mates to irregular surfaces thus filling gaps at low pressure.

PROPERTIES

High thermal conductivity
Low hardness
Electrically insulating

AVAILABILITY

Sheet 220 x 400mm.
Naturally tacky both sides
Cut according to customer specifications

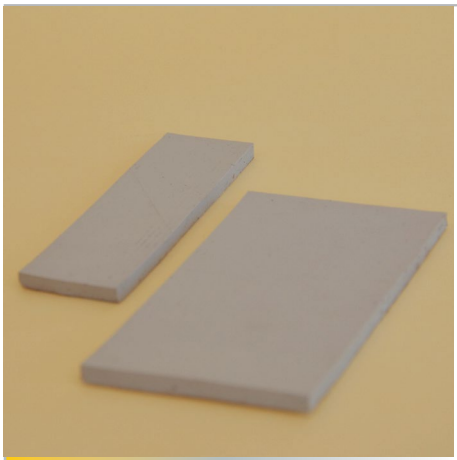
TECHNICAL DATA

	UNIT	ITEM				
		TM-KHC6-40-100	TM-KHC6-40-200	TM-KHC6-40-300	TM-KHC6-40-400	TM-KHC6-40-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	40	40	40	40	40
Thermal Resistance @5 psi	°C-inch/W	0,35	0,7	1	1,3	1,7
Thermal Conductivity	W/mK	6,0	6,0	6,0	6,0	6,0
Breakdown Voltage	V (AC)	>5000	>5000	>5000	>5000	>5000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Colour	Blue

TM-KT12



Utra soft thermal pad
12 W/mK

TM-KT12 is an ultra soft silicone interface material with a superior thermal conductivity and very high dielectric strength. Through its very high softness and flexibility, the material perfectly mates to irregular surface thus filling gaps at very low pressure.

PROPERTIES

Very high conductivity
Ultra soft
Electrically insulating

AVAILABILITY

Sheet 320X320mm.
Natural tacky both sides
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM				
		TM-KT12-100	TM-KT12-200	TM-KT12-300	TM-KT12-400	TM-KT12-500
Thickness	mm	1,0	2,0	3,0	4,0	5,0
Hardness	Shore 00	-	-	-	-	-
Thermal Resistance @5 psi	°C-inch/W	0,15	0,2	0,4	0,7	1
Thermal Conductivity	W/mK	12	12	12	12	12
Breakdown Voltage	V (AC)	13000	13000	13000	13000	13000
Operating Temperature	°C	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200	-50 to + 200
Flame Rating		V0	V0	V0	V0	V0

Upon request it is possible to have the thicknesses 0,5 / 1,5 / 2,5 / 3,5 / 4,5 mm.

Material	Ceramic filled silicone
Colour	Gray

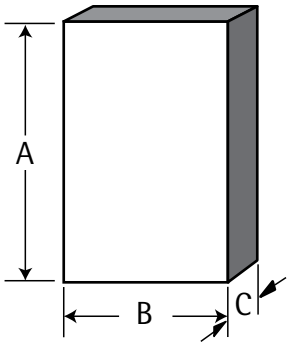
TM-CA

Thermal conductive caps

Thermo-silicone caps of the CA type are made of silicone filled with highly thermally conductive ceramics.
Their very good thermal properties as well as their high dieletric strengths make them the perfect material to be used in most applications.
Ideal with the use of finger clips.

PROPERTIES

Thermal conductive
Insulating
Shock resistance
Fireproofing



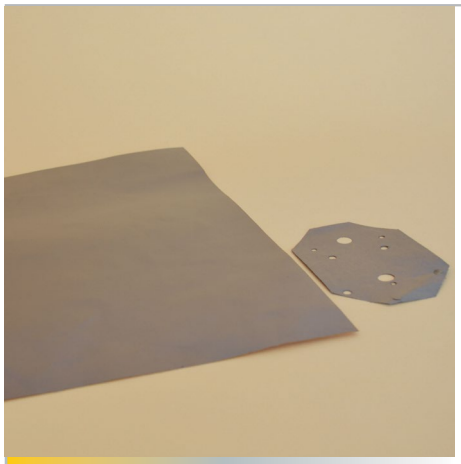
TECHNICAL DATA

	UNIT	ITEM		
		TM-CA 220A	TM-CA 220B	TM-CA 3PA
Dimension a	mm	21,5	16,0	28,5
Dimension b	mm	11,5	11,5	17,5
Dimension c	mm	5,9	5,9	5,9
Thickness	mm	0,6		
Hardness	Shore A	85		
Approx. Thermal resistance	°C/W	0,28		
Thermal conductivity	W/mK	1,0		
Operating temperature	°C	-30 to +200		
Breakdown voltage	V(AC)	3000		
Flame Rating		V0		

Upon request it is possible to have also the thicknesses 0,5/1,5/2,5/3,5/ 4,5mm.

Material	Silicone
Reinforcement	Fiberglass
Colour	Grey

TM-LGR



Thermal graphite

TM-LGR is a graphite interface material with an extraordinary high thermal conductivity along length and width (X-Y – direction) and a good thermal conductivity through the thickness (Z – direction). Due to its extremely high thermal conductivity in the X-Y direction, it is ideally used in application to prevent hot spots.

PROPERTIES

High thermal conductivity in X-Y direction
Soft and flexible
Electrically non insulating

AVAILABILITY

Roll 1mt.x100mt.
With adhesive (/A)
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM	
		TM-LGR0125	TM-LGR0250
Thickness	mm	0,125	0,250
Hardness	Shore 00	80	80
Thermal resistance @ 100psi	°C-inch/W	0,040	0,060
Thermal conductivity x-y direction	W/mK	300	300
Thermal conductivity z direction	W/mK	15	15
Operating temperature	°C	-40 to + 400	-40 to + 400
Flame rating		V0	V0

Upon request it is possible to have also the thicknesses 0,5/1,5/2,5/3,5/ 4,5mm.

Material	Graphite
Colour	Black

TM-PCAB/PCNP

Thermal phase change material

TM-PCAB/PCNP is heat reinforced polymer, designed to meet the thermal conductivity and reliability demand for high performance application.
The material is solid in room temperature and installation is completely convenient, used between heat sink and devices.

The phase change interface material can not be used as electrical insulating material.

PROPERTIES

Low heat resistance and low stress
Low volatility - less than 1%
Flowing but not silicone oil
Self-adhesive, easy to use

AVAILABILITY

Sheet according to customer specification
Cut according to customer specification

TECHNICAL DATA

	UNIT	ITEM	
		TM-PCAB	TM-PCNP
Color		Black	Pink
Total thickness	mm	0,18	0,127
Carrier		Aluminum foil	
Thermal resistance @ 100psi	°C-inch /W	0,030	0,050
Thermal conductivity	W/mK	2,5	1
Phase change temperature	°C	55	55
Operating temperature	°C	-45 to + 125	-45 to + 125
Storage temperature	°C	<40	<40
Storage time	Month	24	12

Upon request it is possible to have also the thicknesses 0,5/1,5/2,5/3,5/ 4,5mm.

Material	Reinforced polymer

TM-ES016

TM-ES016 is based on aluminum foil coated with a thermal conductive synthetic resin adhesive on both sides.

Double side thermal resin adhesive

AVAILABILITY

Roll form 330mm. X 33mt.
Customized roll
Customized sheet
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM
		TM-ES016
Total thickness	mm	0,16
Adhesive strength	N/cm	5
Approx.Thermal resistance	°C/W	0,56
Thermal conductivity	W/mK	0,285
Operating temperature	°C	-20 to 160°C

Material	Synthetic resin adhesive
Reinforcement	Aluminum foil
Colour	White

TM-CT020

Double side thermal acrylic adhesive

TM-CT020 ia a kind of thermal acrylic tape applied in the gap between heat sink and other power consumption semiconductor. The adhesive is in nature of strong bonding strength and low thermal resistance.
Ideal to replace thermal silicone grease with very good mechanical fixation properties.

AVAILABILITY

Roll form 500mm x 50mt.
Customized roll
Customized sheet
Cut according to customer specifications

TECHNICAL DATA

	UNIT	ITEM
		TM-CT020
Total thickness	mm	0,20
Adhesive strength	N/cm	1,2
Approx. thermal resistance	°C/W	0,35
Thermal conductivity	W/mK	1,5
Operating temperature	°C	-40 to +180

Material	Acrylic adhesive
Reinforcement	Fiberglass
Colour	White

TM-GEL-J33

Thermal gel

TM-GEL-J33 thermal gel material is designed to be used to replace the thermal gap pad when less stress is required on devices. TM-GEL J33 thermal gel material is very soft gel-like material and has a rather good thermal conductivity and extreme low hardness. It is dispensable to form-in-place filling in air gaps between PC board and heat sinks or a metal chassis.

TM-GEL-J33 is a pre-cured and ready to be used, there is no need to be cured during application. In customer site, therefore it is more effective for both manufacturing and storage. It has a longer self life than normal thermal gel material. It is used by manual extrusion operation or automatically dispensing by robot machine.

PROPERTIES

Good thermal conductivity
Low hardness
Electrically insulating

TECHNICAL DATA

	UNIT	ITEM
		TM-CT020
Density	g/cc	2,9
Hardness	Shore00	10
Continuos temperature	°C	55 to 200
Thermal conductivity	W/mK	3
Breakdown voltage	V(AC)	8000
Flame rating		V0
Shelf life @ 25°c		24 months

Material	Thermal gel
Colour	Light green

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