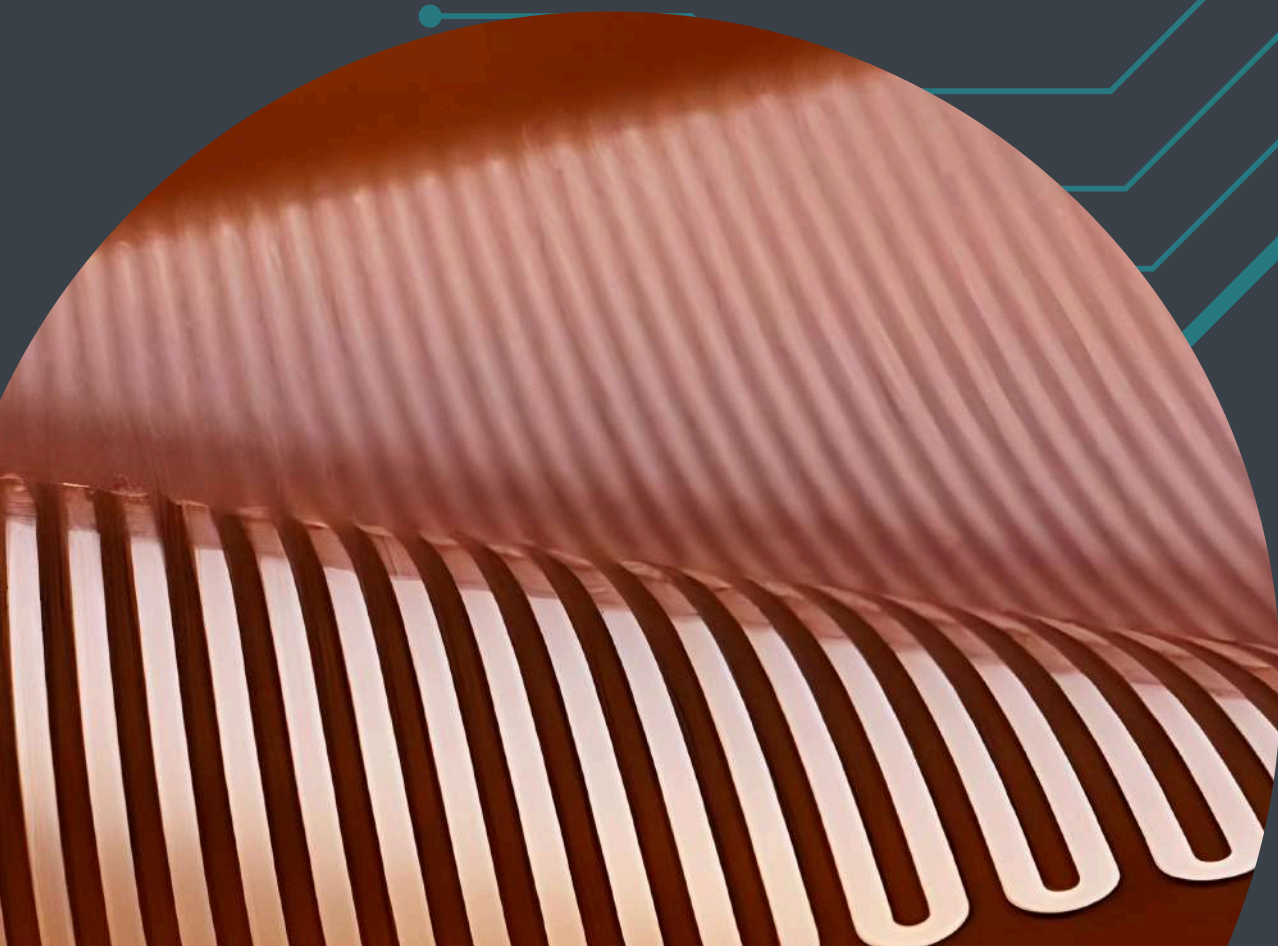


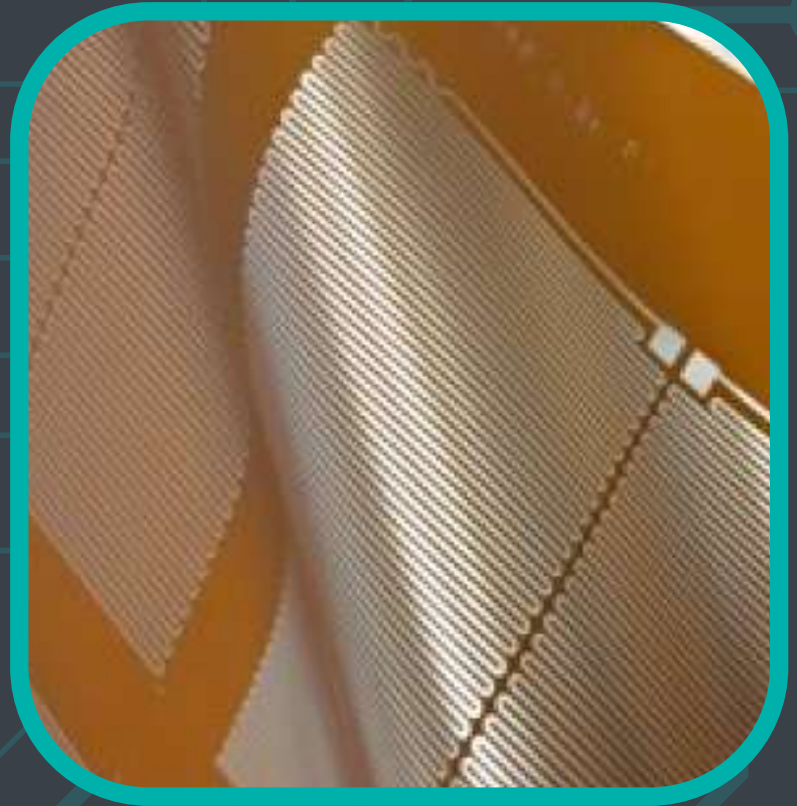
SILGA SOLUTIONS FOR THERMAL MANAGEMENT SYSTEM

Flexible Heaters



SILGA SOLUTIONS FOR THERMAL MANAGEMENT SYSTEM

The combination of **flexible** electronics with **lightweight** support started a new generation of Flexible Heaters, that can adapt to any shape and ensure the optimal functioning of **Thermal Management System**.



SUBSTRATE MATERIALS

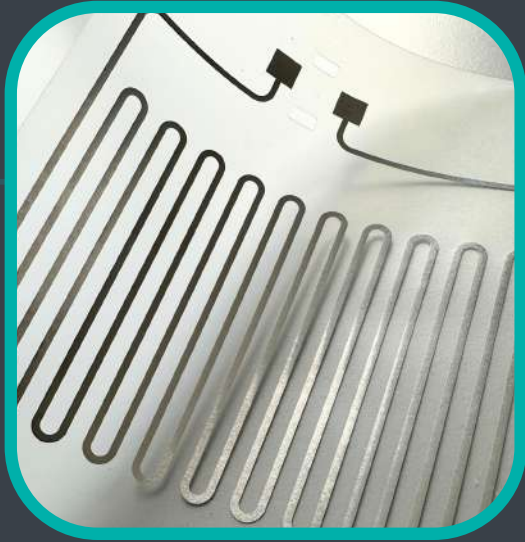
	Max. operating temperature
PET	Up to 105°C
PEN	Up to 125°C
Polymide	Up to 150°C

RESISTIVE MATERIALS

	Density (kg/m ³)	Specific heat (J/Kg °K)
Copper	8970	387
Aluminum	2707	900
Stainless Steel	8009	500
Costantan	8900	380

* other materials available on request

TECHNOLOGIES



Etched Flexible Heaters

Made on a flexible clad laminated by a photolithographic (**subtractive**) process to create very precise elements on the surface.

SUBSTRATE MATERIALS: PET, PEN, PI, PP and other insulation materials for customized solutions



PTF Flexible Heaters

Made on a flexible polymer substrate by a green **additive** process

SUBSTRATE MATERIALS: PET, PEN, PC, PI and others as fabrics

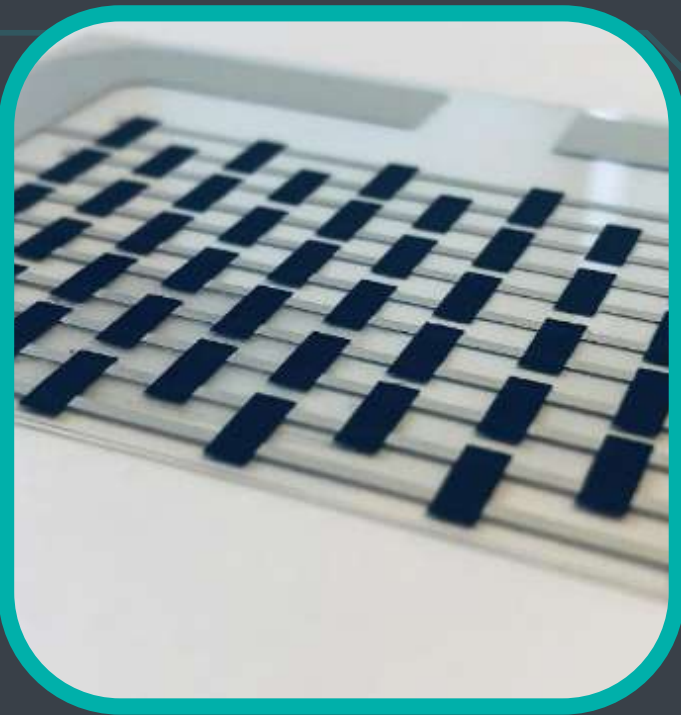
ETCHED FLEXIBLE HEATERS SPECIFICATIONS

Working voltage	up to 400V
Operating temperature	-40/+150°C (+200°C peak temperature for short time)
Power density	0.1 - 6.5w/cm ²
Tolerance on resistance value	+ / - 10%
Max. size	600x700mm
Thickness	from 0.1 mm
Mounting	PSA or mechanical

PTF FLEXIBLE HEATERS SPECIFICATIONS

Working voltage	up to 250V
Drive current	1 A max (steady state)
Power density	0,15 to 0,3 W/cm ²
Thickness	from 0.1 mm
PTC ink setpoint	from 55 to 105°C
Operating temp.	-40 to 80°C

PTC INKS



Positive Temperature Coefficient (PTC) inks are used to create **self-regulating** heaters.

As the temperature increases, the resistance increases as well.

At a certain temperature the current flow is stopped and the temperature remains stable, **without using thermistors.**

ADDITIONAL OPTIONS

- **PSA adhesives** for the perfect adhesion to the surface to be heated
- Integration with **leadwires, connectors, flex circuits**
- **Temperature sensors** as thermostats, RTD, thermistors
- **IMS substrate** when a superior thermal dissipation is required

BENEFITS

- High flexibility
- Easy installation
- Space and weight saving
- Effective heating
- Tailor-made for your needs



APPLICATIONS



Automotive

- Seats
- Interiors
- AdBlue tank
- Battery TMS
- Mirrors



Medical

- IV fluids & blood containers
- Blankets
- Incubators
- Ventilators



Appliances

- Refrigerators
- Air conditioning
- Coffee machines

APPLICATIONS



Wearable

Technical apparel
Professional apparel
Pads
Gloves



Aerospace

Satellites
Solar panels
Cabin interiors
Battery thermal control



SILGA

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