

# New Thermal Materials for Power Electronics

**Electrically Insulating + Thermal Conductive Materials and Electrically Conductive inks**

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# Corporate Structure of ALTANA

Four divisions, one successful group



Sales €2,742 m  
Employees 7,939



Paint additives  
Plastics additives  
Industrial applications  
Measuring and  
testing instruments

Sales in €m: 1,208  
Employees: 2,515



Coatings  
Graphic arts  
Cosmetics and personal care  
Plastics industry  
Functional applications

Sales in €m: 351  
Employees: 1,711



Wire enamels  
Electrical  
**Electronic**  
Engineering materials

Sales in €m: 686  
Employees: 2,101



Flexible Packaging  
Metal Packaging Solutions  
Paper & Board

Sales in €m: 496  
Employees: 1,354

All figures relate to the fiscal year 2023.

# ELANTAS Europe familiar with Power Electronics

## Specialist for Electrically Insulating Resins

### Product Portfolio by Application



Wire Enamelling



Impregnating



Conformal Coating



Lamination &  
Infusion for Composites



Printed Electronic



Special Coating



Flexible Electrical  
Insulation



Casting & Potting



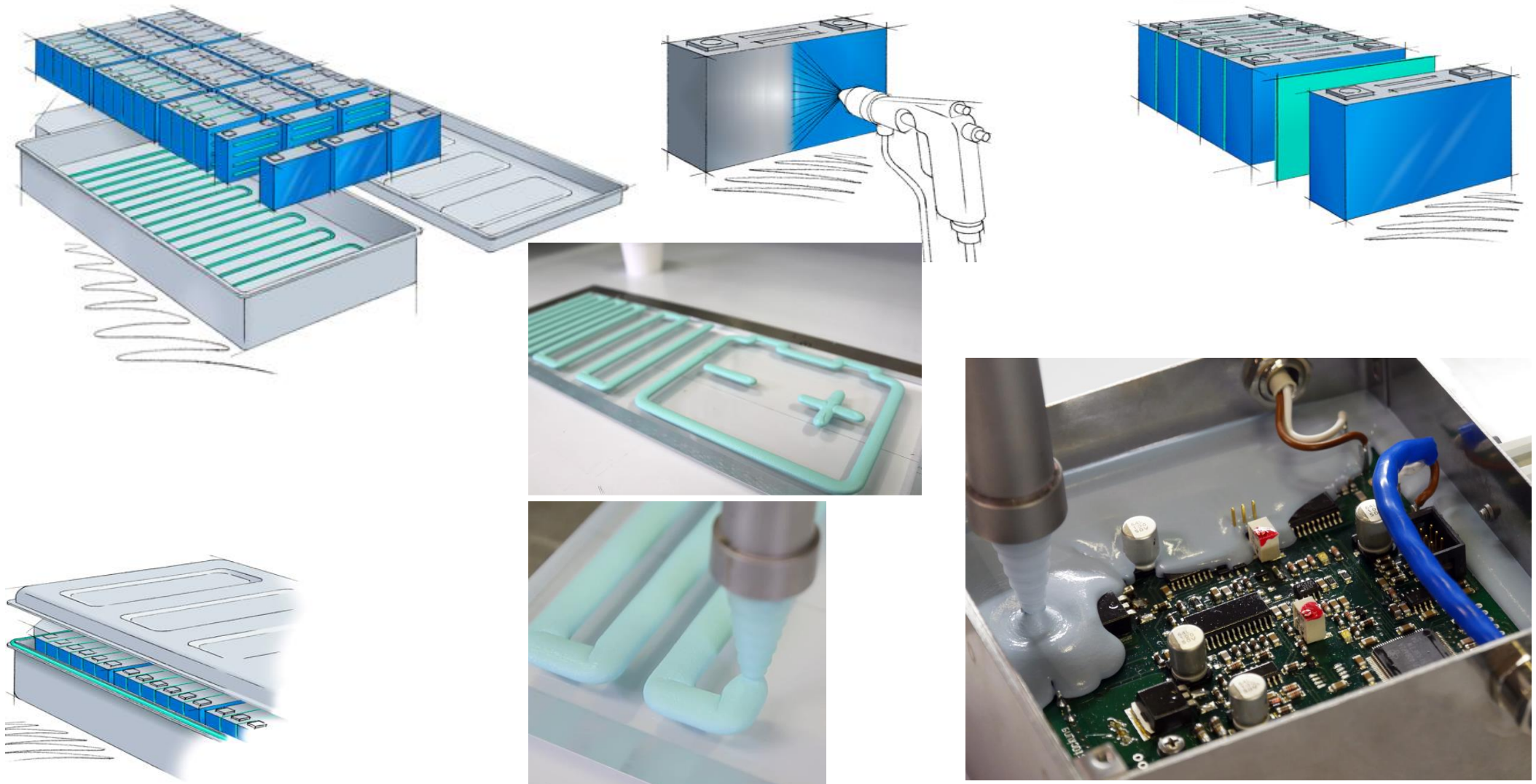
Tooling



Bonding

# Liquid Thermal Interface Materials (TIM)

## Gap Filler, Potting, Adhesives, Pastes, Coatings, Heatings



# Thermal Interface Materials – Considerations (1/2)

## Material Properties

- „I need maximum thermal conductivity possible!“
  - What is the measurement reference?
  - How can you modify the layer thickness?
  - What flexibility is needed?
  - How much is desired / How much is needed?
- „I need maximum thermal capacity at minimum load!“
- Electrical insulation capacity required?  
(Fillers affect the electrical conductivity!)
- Chemical / Thermal resistance required?
  - Silicone, Polyurethane, Epoxide?

# Thermal Interface Materials – Considerations (2/2)

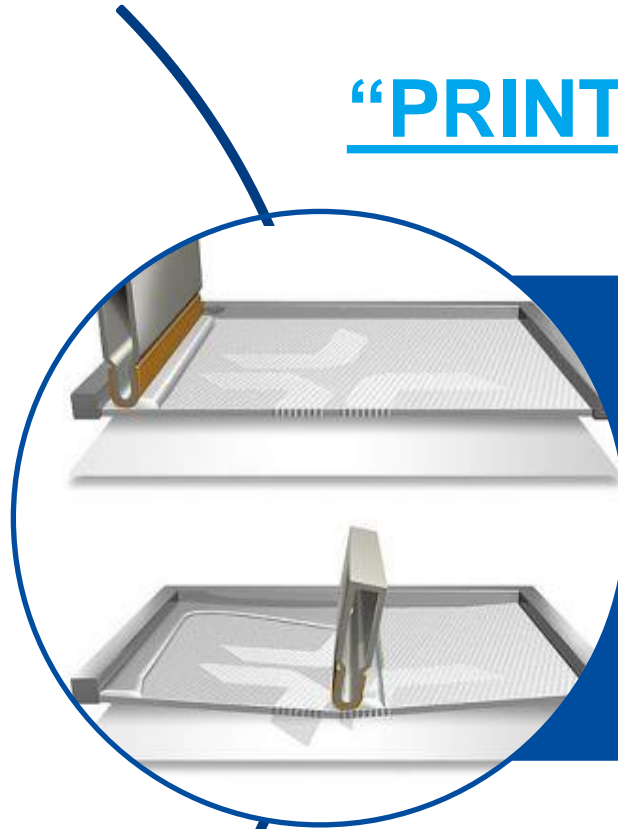
## Commercial, Design and Processing

- (Non-) Flowability
- Type of filler (Price, Processing)
- Processing of the material(s)
- Concept of thermal control
  - Heat transfer (to a thermal exchange component)
  - Thermal buffer
  - ...

# Screen Printing of functional inks to realize electronics...

...copper, silver, carbon, dielectric inks and relevant adhesives

## “PRINTED ELECTRONICS”



### Screen Printing

- Resolution:  $\geq 30 \mu\text{m}$
- Wet film thickness:  
1  $\mu\text{m}$  - 100  $\mu\text{m}$
- Small quantities
- 1,000 sheets /h

# Printed Electronics: Printed Heating Elements



## Heat up and Cool down Phase

### Push-Aspects

- Thin Design – Little Space Required
- Adjustable / Customizable:
  - Mechanically Flexible
  - Flexible in the choice of substrate
  - Precise Heat Distribution
  - Lightweight
  - Integrability
- Additive Manufacturing (Ecological Footprint)

### Considerations

- Silver preferred for performance reasons
- New and Innovative Environment

Thank you for  
your attention.