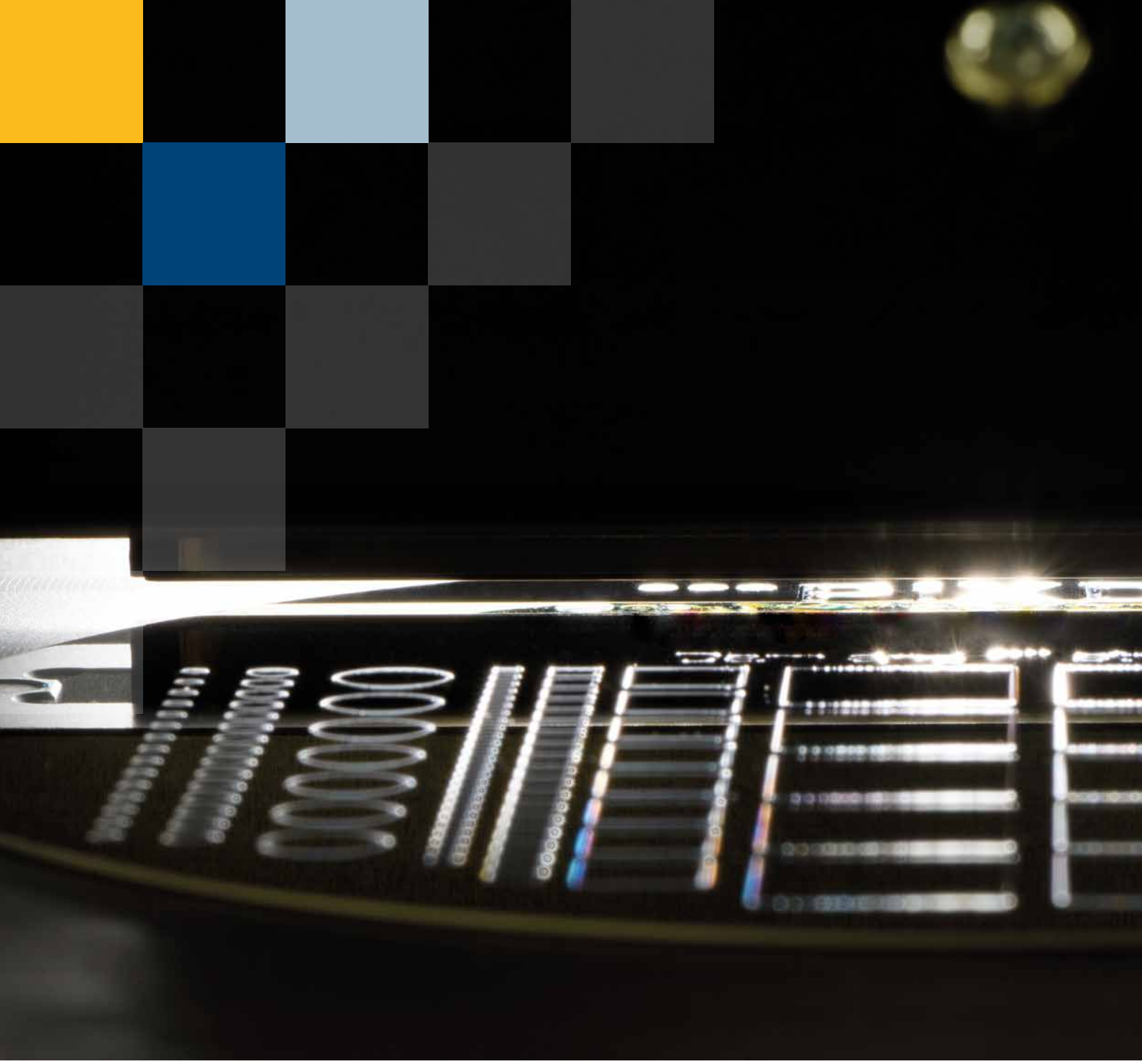
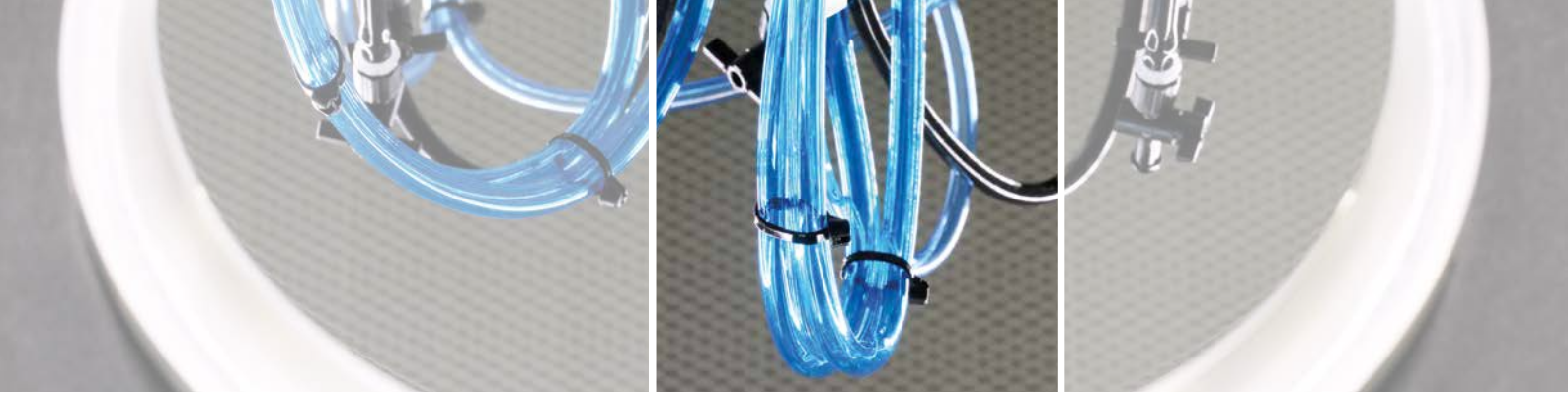


INKJET PRINTING

PiXDRO INKJET PRINTING TECHNOLOGY

INKJET PRINTING FOR R&D AND VOLUME PRODUCTION

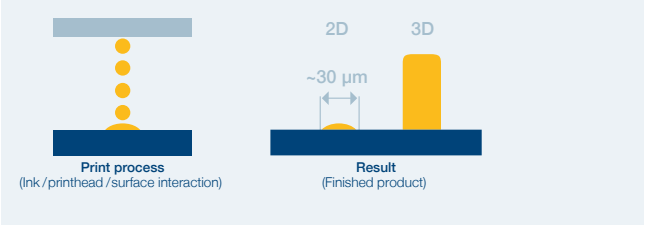
SÜSS MicroTec



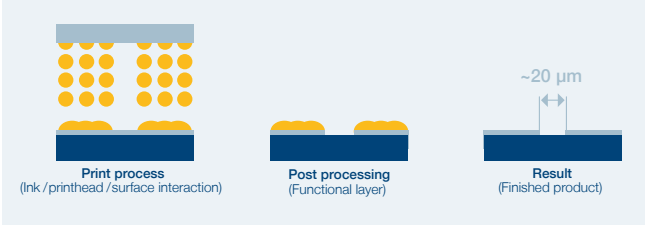
PiXDRO INKJET PRINTING TECHNOLOGY
FOR A LARGE VARIETY OF PROCESSES

The PiXDRO industrial inkjet printing equipment applies functional materials for a variety of applications. These functional materials can have dielectric, conductive, adhesive, mechanical, optical or chemical properties, and are printed with pico-liter sized droplets from a digital file. Inkjet printing is an additive manufacturing technology, hence has great advantages in relation to material usage, productivity, environmental impact and costs.
Because of its precise drop placement and volumes, functional inkjet printing has numerous applications in printed and flexible electronics, displays, OLED, sensors, PCB, semiconductor assembly, chemical machining, photovoltaics, life science, and optics. Inkjet printing can create very fine features, down to 20 micron, and can replace conventional techniques such as lithography, screen printing, spray coating and dispensing. Because it is fully digital, there is no need for masks and screens, significantly saving material usage, and enabling fast product changeover times.

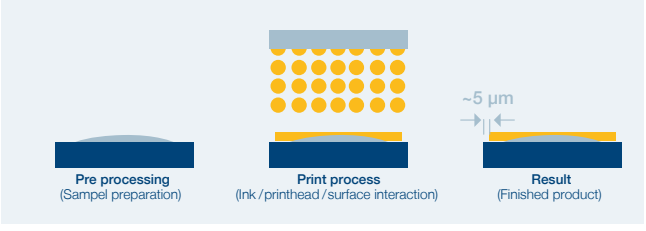
Direct Patterning
Functional materials, Etchants



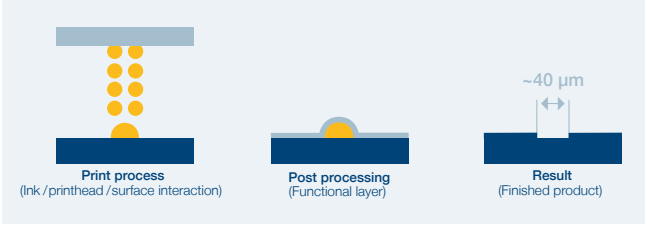
Masking
Etching, Plating

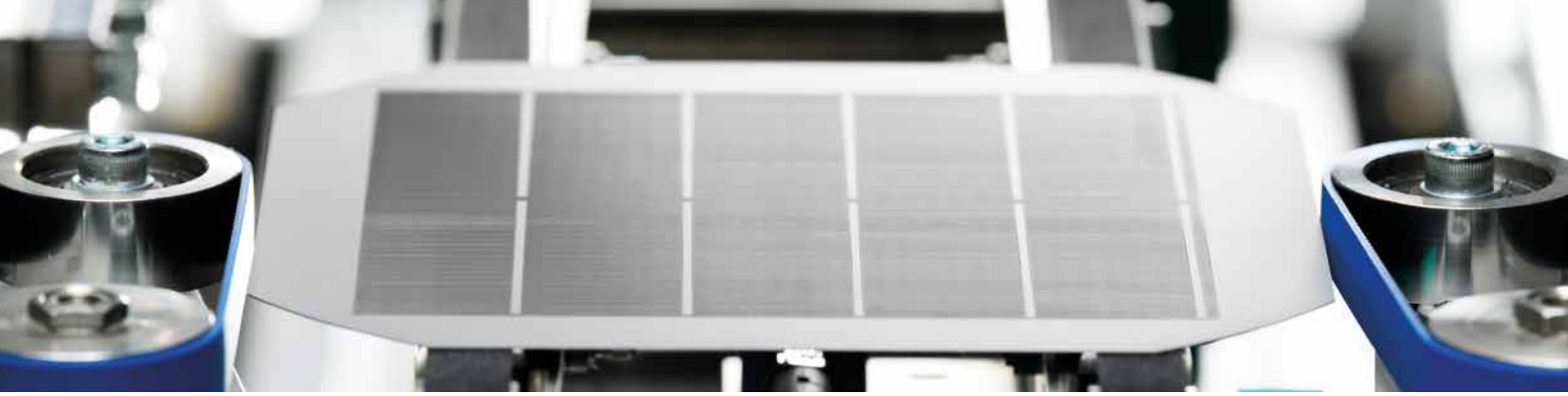


Homogeneous Layers
High precision coatings, Encapsulation



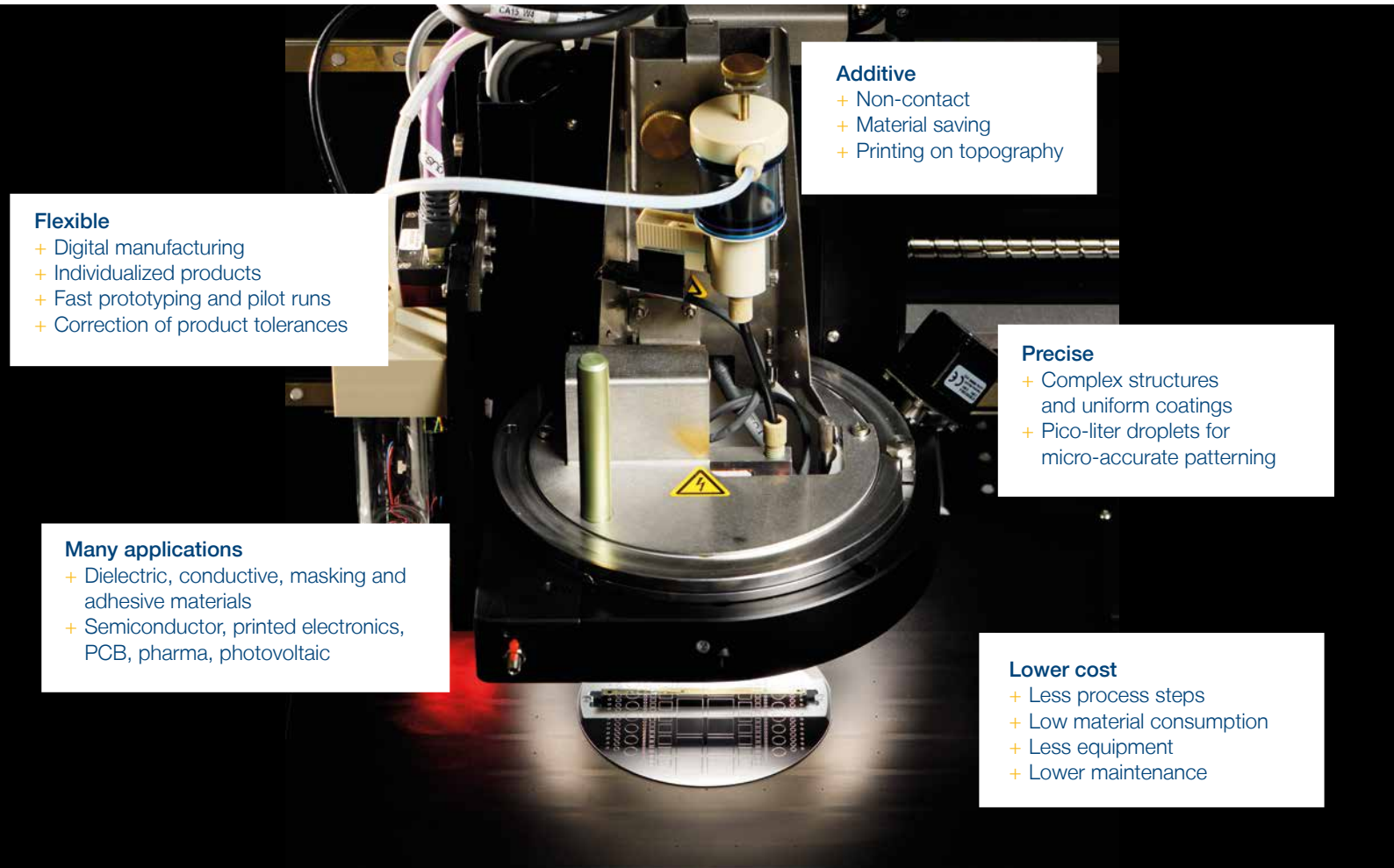
Lift-off Masking





ACCURATE, VERSATILE AND FAST

As inkjet printing is compatible with a wealth of functional materials, it is a very versatile technology. It can be used for direct material deposition for patterned or homogeneous coatings, from tens of nanometers up to tens of micrometers (depending on ink materials). By printing multiple layers of material on top of each other, it can also be used as a 3D printing method.
Inkjet is a non-contact deposition technology, so suitable for fragile and 3D substrates, and can fill trenches and cavities. Furthermore, it is excellent for direct printing of etching and plating masks.
Because industrial printheads have hundreds or thousands of parallel nozzles, and operate at very high frequencies, inkjet achieves very high throughput. The PiXDRO mass production inkjet printers can hold arrays of multiple printheads, enabling high productivity and flexibility.



Additive
+ Non-contact
+ Material saving
+ Printing on topography

Flexible
+ Digital manufacturing
+ Individualized products
+ Fast prototyping and pilot runs
+ Correction of product tolerances

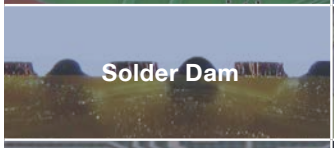
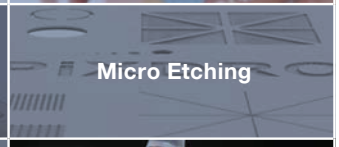
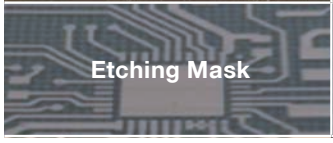
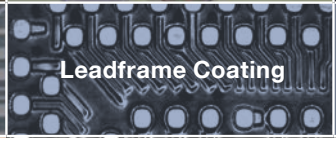
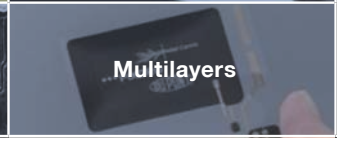
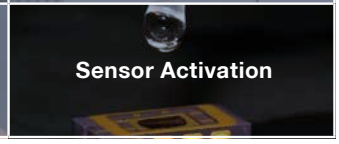
Precise
+ Complex structures and uniform coatings
+ Pico-liter droplets for micro-accurate patterning

Many applications
+ Dielectric, conductive, masking and adhesive materials
+ Semiconductor, printed electronics, PCB, pharma, photovoltaic

Lower cost
+ Less process steps
+ Low material consumption
+ Less equipment
+ Lower maintenance

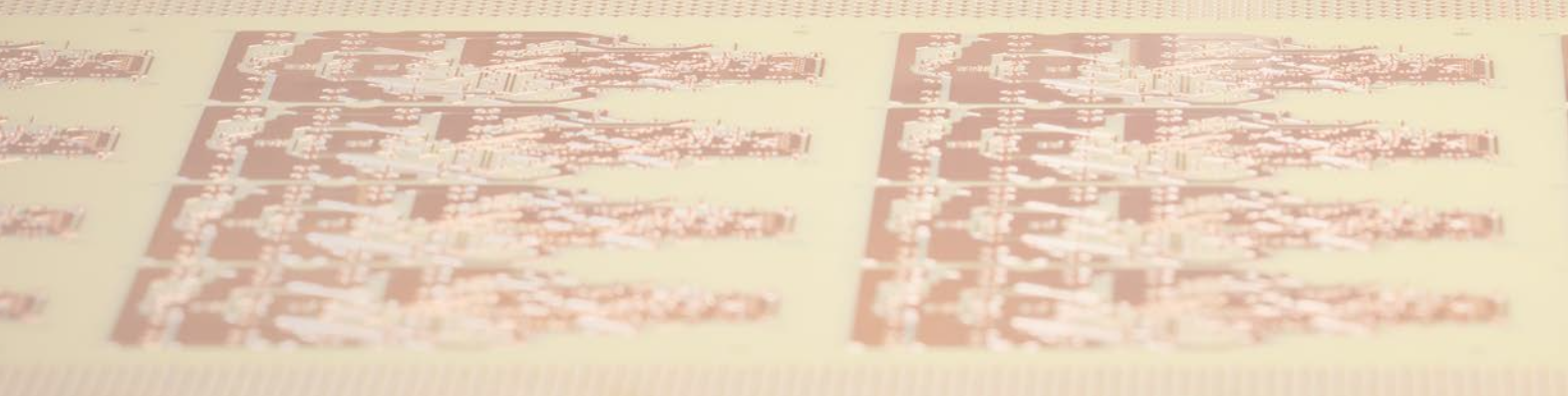
ENABLING FUTURE TECHNOLOGIES

INKJET APPLICATION EXAMPLES

Printed Circuit Board (PCB)	Semiconductor	Printed Electronics (PE)	Others
 Solder Mask	 Passivation	 Metallization	 Pharma
 Solder Dam	 Photo Resist	 Encapsulation	 Micro Etching
 Etching Mask	 Leadframe Coating	 Multilayers	 Sensor Activation

INKJET APPLICATIONS OVERVIEW

	DIELECTRIC	MASKING	CONDUCTIVE	ADHESIVE
Applications	Isolation, protection, filling, stress buffer, encapsulation, solder resist	Etching, plating, lift-off	Direct printing of conductive traces	Die bonding, sensor assembly, glass bonding
Layer Thickness	1 – 100 µm	5 – 40 µm	0.5 – 5 µm	5 – 30 µm
Ink Types	Epoxy (solvent or solid) Polyimide (solvent) Acrylate (solid)	Hotmelt, UV curable	Silver or Copper nanoparticles in solvent; up to 40% solid content	Acrylate Epoxy (solvent)
Feature Size	> 40 µm	> 50/20 µm L/S	> 40 µm	> 50 µm
Properties	Pencil Hardness up to 4H Resistivity up to 10^{16} Ω.cm	Acid and alkaline resistant	Conductivity up to 50% of bulk silver	Adhesion on silicon, glass, PET/PEN foil, metals
Post Treatments	Baking, drying, UV curing	Drying, UV curing	Drying, sintering (thermal, photonic, laser)	Baking, drying, UV curing



UNIQUE BENEFITS OF INKJET PRINTING

COSTS
Additive
Less process steps
No waste
Save materials

PRODUCT SIZE
Scalable
Wide range of product dimensions

FEATURE SIZE
Smaller features
High accuracy

TOPOLOGY
Contact free
3D substrates
Higher yield

PRODUC-TIVITY
Thousands of parallel nozzles

FLEXIBILITY
Digital patterning
Easy product changes

SUSS LP50

Desktop R&D INKJET Printer

+ Research and development of inkjet processes and applications
+ For printing dielectric, masking, conductive and adhesive patterns
+ High precision stages and alignment system
+ Robust, open and flexible platform
+ Direct roadmap to mass production

SUSS JETx

Mass production INKJET Printer

+ Configurable design for various applications
+ Low cost of ownership
+ High productivity
+ Accurate motion systems
+ Small footprint

NORTH AMERICA

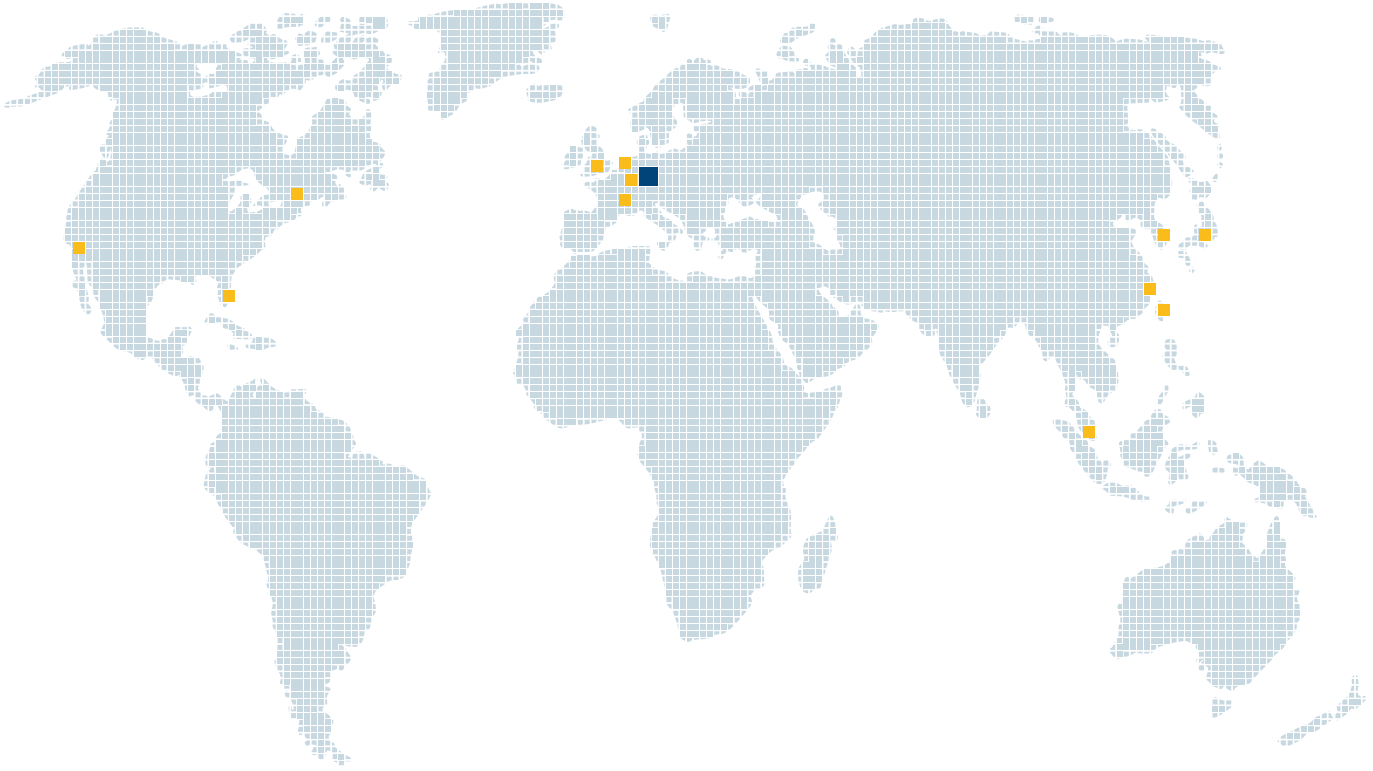
- USA

EUROPE

- Germany
- United Kingdom
- France
- Netherlands

ASIA

- Japan
- Korea
- China
- Singapore
- Taiwan



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