SunTronic Inkjet Materials for Electronics Manufacturing

Experience. *Transformation.*

SunChemical®

a member of the DIC group

Color & Comfort

Inkjet Manufacturing for Electronics Applications

Inkjet technology is driving a remarkable transformation in electronics manufacturing, unlocking greater efficiency, sustainability, and innovation. From depositing functional layers in the manufacture of PCBs, displays, sensors, semiconductors, photovoltaics, printed and organic electronics, and beyond, inkjet technology offers significant advantages over more traditional manufacturing methods:

- **Rapid Prototyping and Design Validation:** Whether by removing the need for an image carrier, replacing photoimaging process steps, or eliminating subtractive processing altogether, inkjet printing can significantly simplify electronics manufacturing.

- **Reduced Material Usage and Waste:** Compared to subtractive processes, inkjet printing offers the potential for lower material usage and waste, contributing to cost savings and a more sustainable approach to manufacturing. Inkjet printing's non-contact deposition nature also offers significant benefits when working with high-value substrates and complex multilayer designs, reducing the risk of damage and lowering scrap rates.

- **High precision printing:** Today's inkjet technologies are capable of higher resolution printing than analog processes, which aligns well with miniaturization trends in electronics.

Shorter time to market

Delivering reliability

Enabling miniaturization

Eco-design friendly process

Overcome your challenges with a reliable materials solutions partner.

Sun Chemical is a market leader in inkjet ink technologies with a successful track record of inkjet process industrialization in multiple markets. The ink technology expertise includes aqueous, solvent, energy curable, oil-based, and phase change inks. SunTronic inkjet inks are designed with OEMs (Original Equipment Manufacturers) to meet their individual printhead and machine needs along with end-use performance, reliability and consistent quality requirements for electronics applications.

SunTronic Inkjet Materials

SunTronic inkjet inks are tested for industrial inkjet printhead compatibility. Typical printheads used with SunTronic Inkjet Materials include multiple models from, for example, Canon, Epson, FujiFilm, Konica Minolta, and Xaar. The printhead selection will depend on intended application, target manufacturing scale and ink properties. Generally, ink viscosity and jetting are the main properties to consider when selecting a compatible printhead. For more detailed information or processing recommendation for SunTronic inkjet inks, contact your local sales representative or refer to the individual product technical datasheets.

Designed with OEM

Printing process reliability

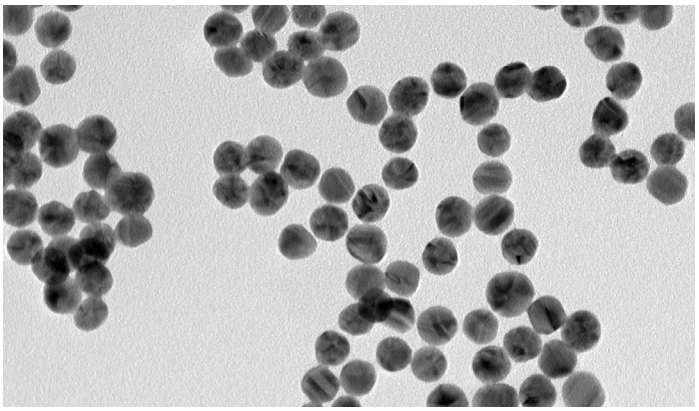
End-use performance

Consistent quality

Technical expertise

Conductive Nanosilver

Used for high conductivity interconnects, electrodes, contacts and antennae. The **EMD5730 nanosilver ink** enables manufacturers to achieve high conductivity and smooth conductive layers on glass, ITO, or other heat stable plastic substrates used in electronics manufacturing.

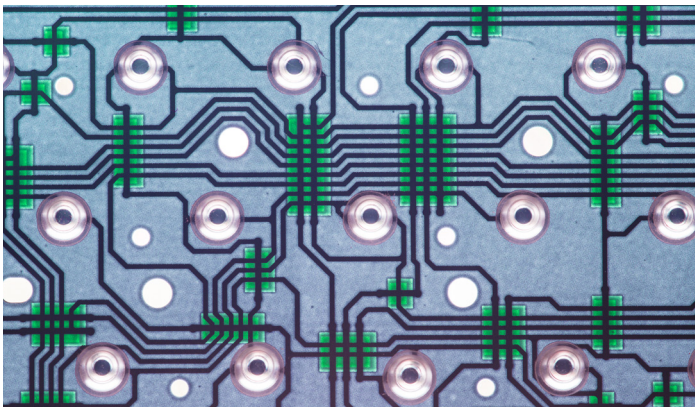


Printed electronics | Flexible Hybrid Electronics | Connectivity | Biosensors | Organic Electronics | Advanced Photovoltaics

Product Name	Viscosity	Jetting Temperature	Product Features
EMD5730	11-13 cP	25-28 °C	High conductivity thermally sintering (150-250 °C) conductive ink with bulk resistivity of 5-15 µ Ohms.cm

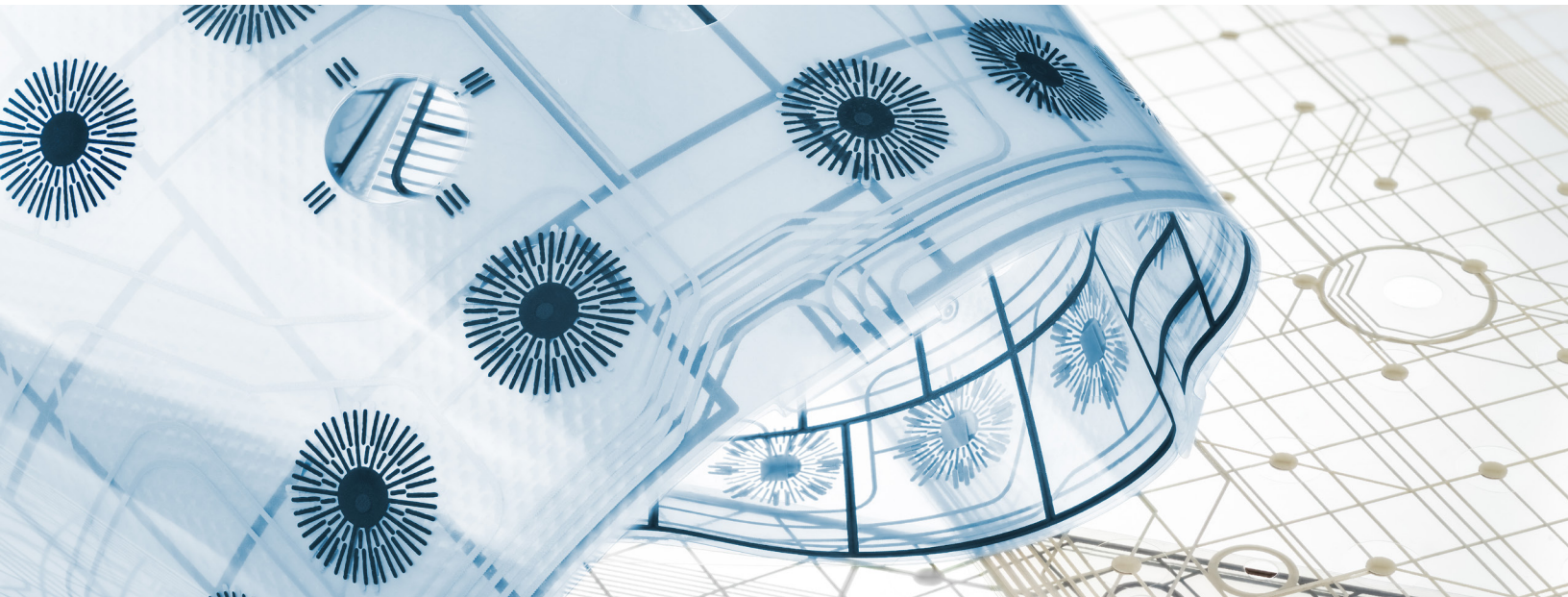
UV/LED Curable Dielectrics

Used as cross-over insulators for multilayer circuits, passivation and protective layers to improve reliability of printed silver circuits. Our **EMD6000 dielectric inks** are suitable for temperature sensitive substrates. They are cured with LED lamps, which are a more environmentally friendly solution than traditional mercury-based UV lamps



Printed electronics | Flexible Hybrid Electronics | Connectivity | Biosensors | Advanced Photovoltaics | PCB

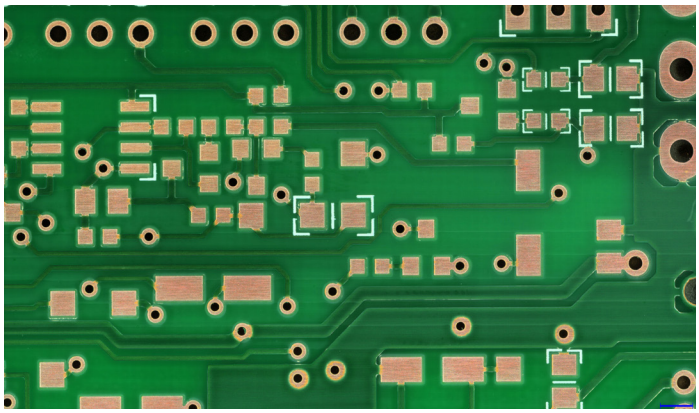
Product Name	Viscosity	Jetting Temperature	Product Features
EMD6200	8.2-9.2 cP	40-50 °C	Flexible UV/LED curing insulator for flexible substrates.
EMD6415	11-13 cP	45-55 °C	Highly crosslinked insulator suitable for rigid substrate. Suitable for a base layer for overprinting of nanosilver ink.



Solder Masks and Advanced Insulators

Used as protective and passivating layers. Our **EMD8500 Dual cure (UV/LED + thermal) insulator inks** exhibit high chemical resistance and mechanical reliability. They are designed for applications in either device manufacturing or electronics assembly, such as PCB solder mask, insulators for silicon wafers or as passivation/protection of metal layers or wires.

PCB Advanced Photovoltaics

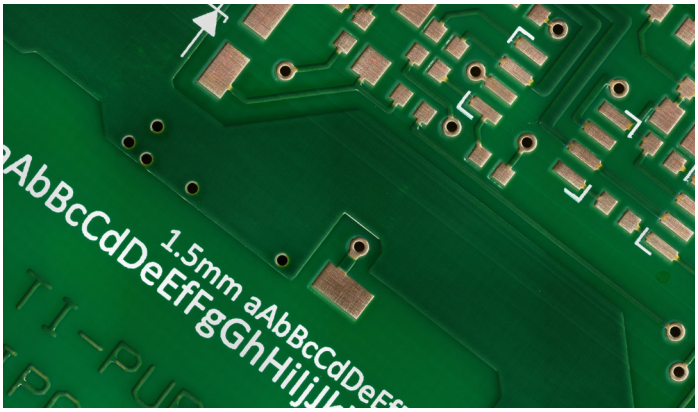


Product Name	Viscosity	Jetting Temperature	Product Features
EMD8500	8.5-11 cP	40-50 °C	Translucent clear insulator with excellent adhesion to glass, metals and silicon wafer surface.
EMD8505	8.5-11 cP	40-50 °C	Black color insulator, adhesion to glass, metals and silicon wafer substrates.
EMD8510	6.0-8.0 cP	40-50 °C	Low viscosity green solder mask for PCB applications.
EMD8515	7.5-10.0 cP	40-50 °C	Green solder mask for PCB applications.

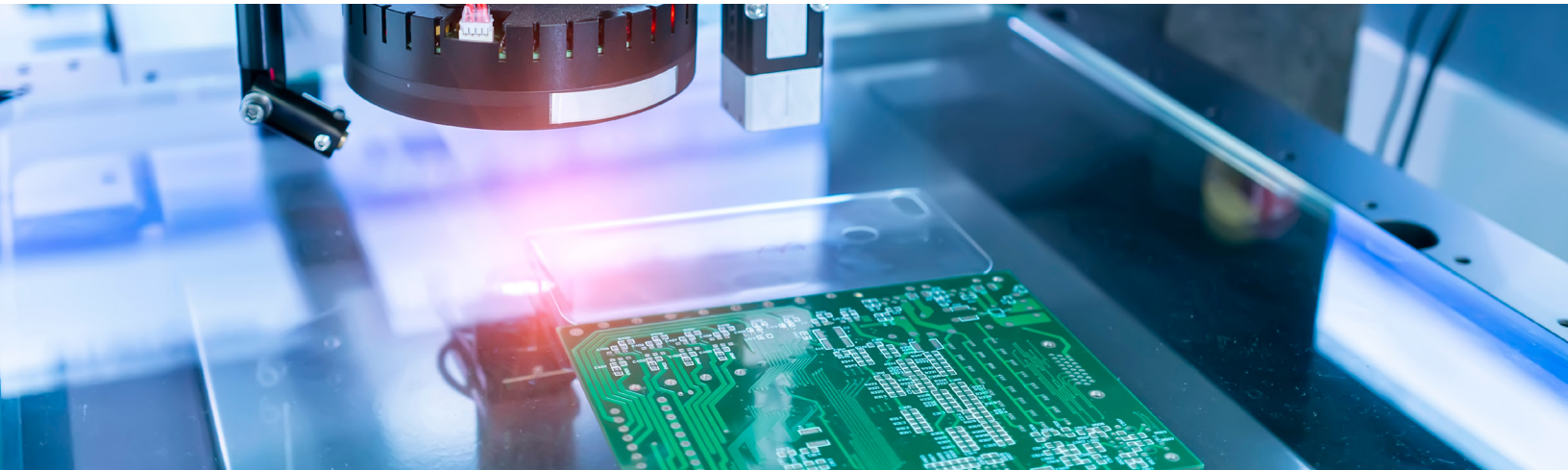
Notation/ Legend Inks

Used as a variable data printing ink for PCB manufacturing. Our **EMD8200 Dual cure (UV/LED + thermal) Notation inks** are designed for excellent adhesion to cleaned solder mask surfaces and exhibit good scratch resistance, high cured hardness and reliability. Notation inks can also be used in solar module assembly applications for marking, masking or as protective layers.

PCB Advanced Photovoltaics



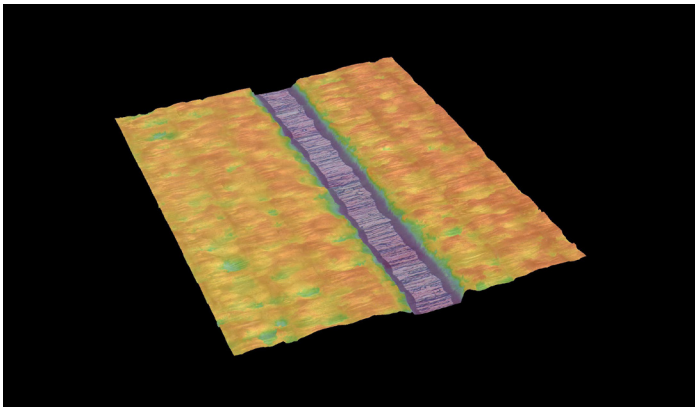
Product Name	Viscosity	Jetting Temperature	Product Features
EMD8200	8.5-11 cP	40-50 °C	A non-yellowing white notation ink with excellent opacity.
EMD8205	8.5-11 cP	45-55 °C	Black notation ink with high opacity.



Etch and Plating Resists

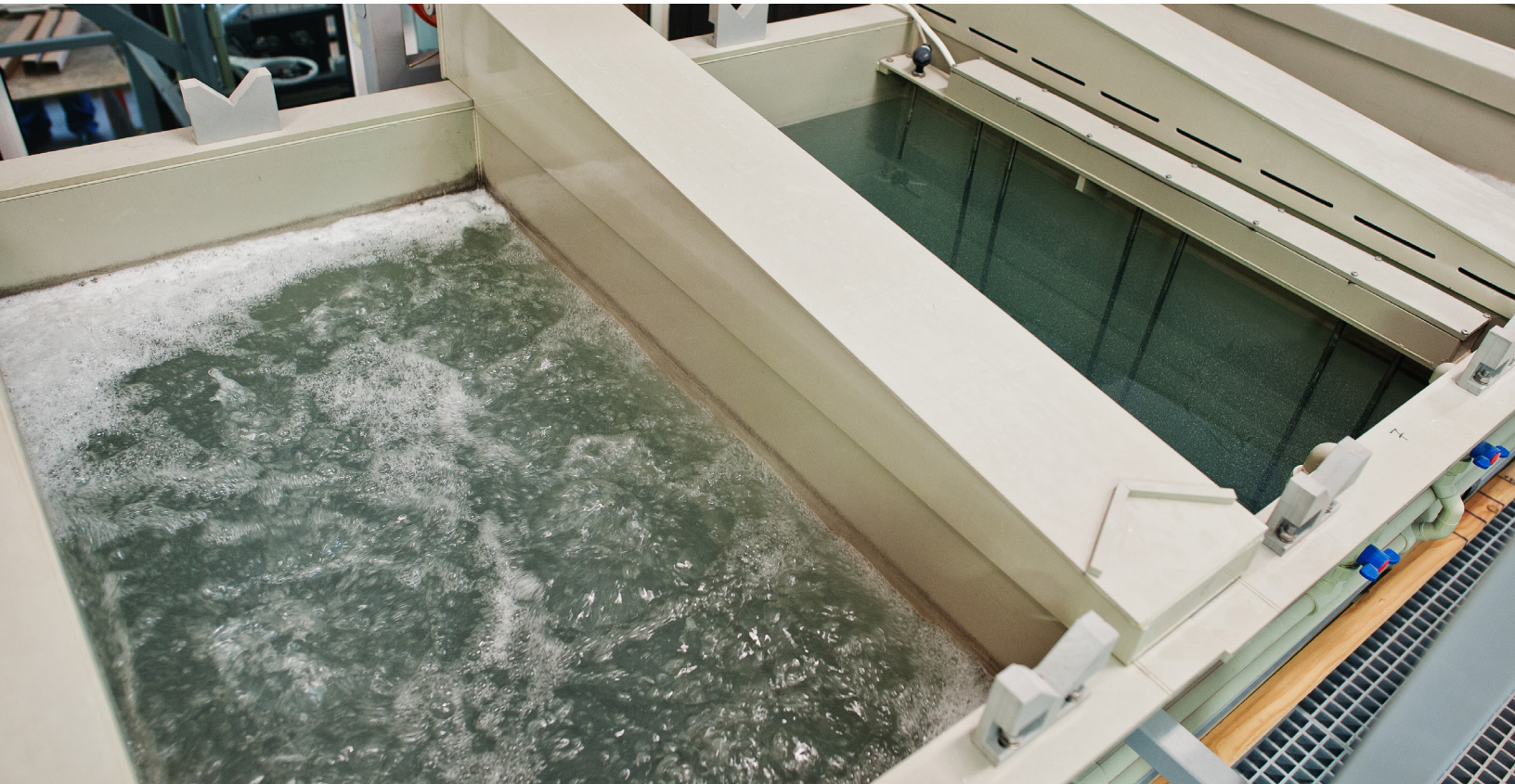
Sun Chemical's SunTronic EMD9000 Hot Melt Etch and Plating Resists are used in direct patterning of the mask for structuring of functional layers, such as passivation, dielectric and metalization layers on silicon wafers or other high-tech substrates used in electronics. The product line includes options to cover a range of chemical resistance and processability requirements needed for etching and plating processes used in electronics manufacturing.

Hot melt inks are in liquid state at elevated temperature during printing, but they solidify upon cooling as they reach the substrate. Therefore, they have excellent printability and high resolution capability for both positive and negative mask designs. They are less sensitive to the nature and texturing levels of the substrates. Hot melt inks are 100% solids and VOC-free technologies. In addition, the inks contain 90%+ of renewable raw materials, making them an excellent choice for responsible material sourcing.



Semiconductor | Advanced Photovoltaics | Connectivity | PCB

Product Name	Viscosity	Jetting Temperature	Product Features
EMD9325	8.5 -13 cP	90-105 °C	Fast alkaline stripping, best for ambient etch/plating processes.
EMD9530	8.5 -13 cP	75-85 °C	Universal ink for widest selection of inkjet printheads.
EMD9545	8.5 -13 cP	85-95 °C	Excellent adhesion, used in higher T etch/plating processes.
EMD9705	8.5 -13 cP	90-105 °C	Best adhesion for wide range of bath chemistries & conditions.
EMD9710	8.5 -13 cP	90-105 °C	Great adhesion along with high chemical resistance for rigid substrates.



Experience. *Transformation.*

A partner who transforms with you.

Today's environment requires more than change. It demands transformation — and a partner who's willing to transform with you. Sun Chemical, a member of the DIC group, is a leading producer of packaging and graphic solutions, color and display technologies, functional products, electronic materials, and products for the automotive and healthcare industries. Together with DIC, Sun Chemical is continuously working to promote and develop sustainable solutions to exceed customer expectations and better the world around us. With combined annual sales of more than $8.5 billion and 22,000+ employees worldwide, the DIC Group companies support a diverse collection of global customers. As you move forward into a world of stiffer competition, faster turnarounds, more complex demands and sustainable products, count on Sun Chemical to be your partner.

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