

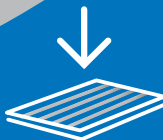
# SOL9621 Series



FRONT-SIDE PASTE

*efficiency*

Patent Pending



## Successful High Efficiency Front-side Paste

- For single-printing application on standard BSF and PERC cells
- For double-printing application on standard BSF cells

The SOL9621 Series, a great market success, is a high efficiency front-side silver conductor for standard BSF and PERC solar cells, applicable both in single- and double-printing. This series of pastes demonstrates outstanding cell performance characteristics: significant reduction in contact resistance and higher voltage gains when compared to the SOL9610 Series.

Due to the product's improved printability, it allows the print of higher aspect ratio lines with an excellent line uniformity and less bleed out, along with reductions in line width.

### KEY BENEFITS

- Very low contact resistance
- For higher aspect ratio
- SOL9621H: A+A solution for higher fill factor in double printing
- SOL9621M and SOL9621J: high efficiency paste for single-printing
- SOL9621P: first PERC paste used in mass production

## EXCELLENT CONTACT ON LDE WAFERS

Heraeus' research and development team continues to work on improving the performance of crystalline silicon solar cells. Our SOL9621 Series is a testament to our ability to improve the output of solar cells. Customers' tests have demonstrated excellent contact performance on lightly doped emitter wafers using SOL9621. Figure 1 shows a 52% reduction in contact resistance. This improvement in contact resistance leads to the 1–2 mV gain in open-circuit voltage (see figure 2).



Figure 1. Heraeus' SOL9621 Series demonstrates a reduction in contact resistance (relative to SOL9610Y) on cells using standard emitter to ultra-low doped emitter wafers. Results are performed on 90–100 /sq. multicrystalline wafers. The SOL9621 Series demonstrates improved electrical performance.

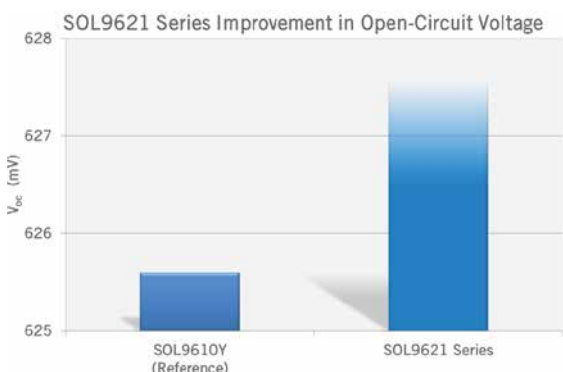


Figure 2. Due to SOL9621 Series' reduction in R<sub>c</sub> on a variety of cell emitter types, improvements in Voc from 1–2mV relative to SOL9610Y were demonstrated by customers.

## IDEAL FOR DOUBLE PRINTING

The SOL9621 Series is also highly recommended for the first and second layer of double printing applications, with customers confirming efficiency gain > 0.1% over the best commercially available double printing pastes.

### Wafer types:

- Monocrystalline
- Multicrystalline

## TYPICAL PROPERTIES

**Suitable for line openings down to:** ≥30 μm

**Solid content:** 91 ± 1.5%

**Fineness of Grind (FOG):**

- 4th scratch: ≤12 μm
- 50%: ≤8 μm

**Viscosity:** HBT Cone and Plate Viscometer (Brookfield):

**SOL9621H:** 60–140 kcps

- CPE-51 spindle, @ 3RPM, 25°C

**SOL9621M+P:** 120–250 kcps

- CPE-51 spindle, @ 3RPM, 25°C

## RECOMMENDED PROCESSING GUIDELINES PRINTING

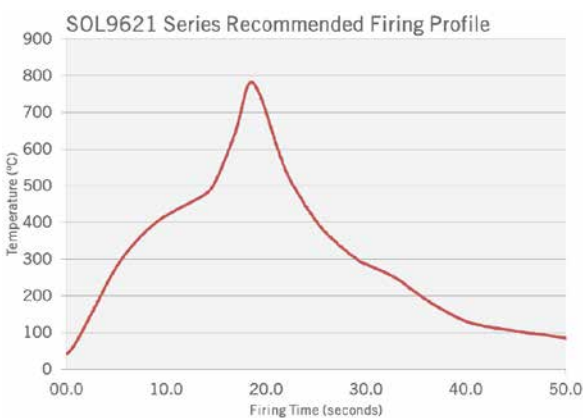
Product	Finger Line Opening	Screen Parameter Recommendations
SOL9621H SOL9621M	≥ 45 μm	400/18 μm mesh
	≥ 35 μm	360/16 μm or 325/16 μm mesh
SOL9621P	≥ 30-45 μm	Ultra calendared 360/16 μm or 325/16 μm mesh

Note: EOM thickness: 12-16 μm

**Printing:** ≥ 200 mm/min printing speed

**Drying:** Typically dried in an IR dryer with a set point of approximately 250–300°C in less than 20 seconds (SOL9621P: less than 30sec.) or 150°C for 10 minutes in circulated air oven (SOL9621P: 150°C–200°C for 10 min.).

**Firing:**



Note: The above firing profile is a standardized recommendation. For a profile optimized to your process, please contact your Heraeus Technical Service representative.

**Storage:**

**DO NOT REFRIGERATE.**

Store in a dry location at 5°C–25°C. Allow paste to come to room temperature prior to opening. Spatulate well before using.

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