

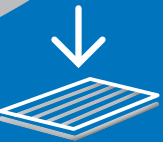
# SOL9350 Series



FRONT-SIDE PASTE

*efficiency*

Patent Pending



## New p<sup>+</sup> Contact Paste for N-type Cells

- For IBC cells
- For p<sup>+</sup> doped areas

N-type cell designs have demonstrated high efficiencies for cell manufactures and Heraeus has supported this effort for over three years with the development and mass production of our SOL9383 Series pastes. Heraeus continues to innovate through investments in R&D and has developed pastes with greater performance for n-type cells.

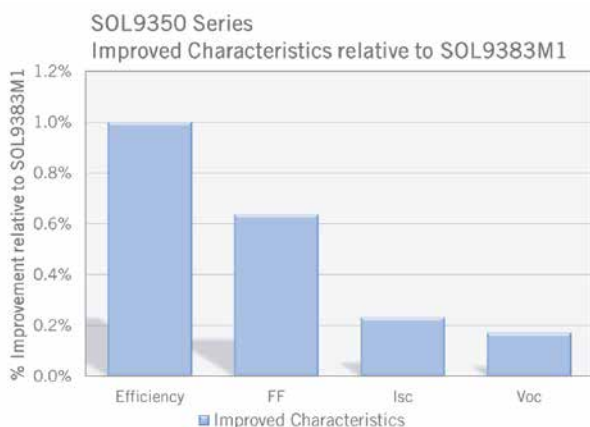
The Heraeus SOL9350C is our newest n-type paste for p<sup>+</sup> wafer surfaces. In conjunction with our pastes for n<sup>+</sup> wafer surfaces, beta test customers have demonstrated higher cell efficiencies with 20% less paste usage per cell. This translates into a significant reduction in a cell's cost per watt.

### KEY BENEFITS

- Higher cell efficiency
- Improved printability / line uniformity
- Finer line resolution
- Co-fireable with Heraeus n-surface paste

## HIGHER CELL PERFORMANCE

Heraeus' SOL9350 Series is our newest front-side metallization pastes for n-type cell designs with p<sup>+</sup> wafer surfaces. The performance of this series of pastes is an improvement over our industry leading SOL9383 Series, which has been in mass production for over three years for n-type cell designs. Test results show that SOL9350 Series has significant improvement in cell efficiency and other electrical characteristics relative to SOL9383M1.



## IMPROVED PRINTABILITY

Beyond the electrical performance, the SOL9350 Series has improved printability over the SOL9383 Series. The SOL9350 Series of pastes allow for excellent flooding and low bleed out. These features give the ability for finer line resolution with improved line uniformity and higher aspect ratio. In combination with the excellent contacting properties, overall cell performance is increased over the previous generation of paste.

## TYPICAL PROPERTIES

**Solids:** 90.0 ± 1%

### Viscosity:

HBT Cone and Plate Viscometer (Brookfield):

- 150–250 kcps
- CPE-51 spindle, @ 1 RPM, 25 °C

HBT Cone and Plate Viscometer (Haake):

- 16–24 Pas
- Plate/cone (Ø = 20 mm, angle = 0.5°), @ 100 s<sup>-1</sup>, 25 °C

**Wafer Types:** Monocrystalline

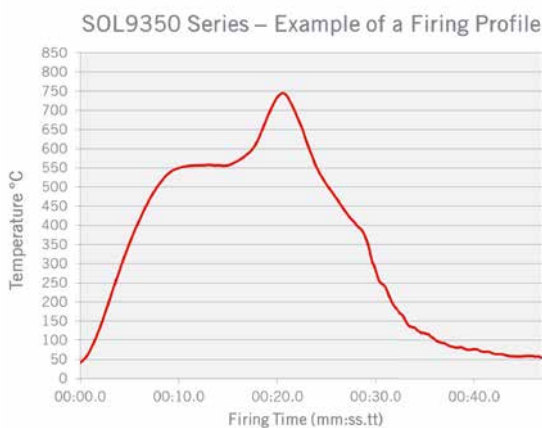
## RECOMMENDED PROCESSING GUIDELINES

### Printing:

Design Finger Line Opening	Screen Parameter Recommendations
≥ 55 µm	290 mesh, 20 µm stainless steel wire, 12–16 µm EOM
≥ 50 µm	400 mesh, 18 µm stainless steel wire, 12–16 µm EOM
≥ 45 µm	360 mesh, 16 µm stainless steel wire, 12–16 µm EOM

**Drying:** Typically dried in an IR belt dryer with set points of 250–300 °C in less than 20 seconds or 150 °C for 10 minutes in circulated air oven.

**Firing:** IR furnace with actual wafer; peak temperature from 740–800 °C



Note: Temperature profile measured on actual wafer with Omega thermocouple KMQXL-020G-18.

**Finger opening:** 35–90 µm

**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.

### EUROPE (GERMANY)

**Heraeus Deutschland GmbH & Co. KG**  
63450 Hanau  
Phone +49 6181 35 5051  
pv.hde@heraeus.com

### AMERICA (USA)

**Heraeus Precious Metals North America Conshohocken LLC/Heraeus Incorporated**  
19428 W. Conshohocken  
Phone +1 610 825-6050  
pv.hpmmc@heraeus.com

### ASIA (TAIWAN)

**Heraeus Materials Technology Taiwan Ltd.**  
33855 Luzhu (Taoyuan)  
Phone +886 3 321 9937  
pv.hmtt@heraeus.com

### ASIA (KOREA)

**Heraeus Korea Corporation**  
16506 Suwon-si (Gyeonggi-do)  
Phone +82 31 270 9428  
pv.hmk@heraeus.com

### ASIA (CHINA)

**Heraeus Materials Technology Shanghai Ltd.**  
201108 Shanghai  
Phone + 86 21 3357 5688  
pv.hmts@heraeus.com

### ASIA (JAPAN)

**Heraeus K. K.**  
112-0012 Tokyo  
Phone +81 3 6902 6564  
pv.hkk@heraeus.com

### ASIA (SINGAPORE)

**Heraeus Materials Singapore Pte. Ltd.**  
639335 Singapore  
Phone +65 6571 7888  
pv.hmsl@heraeus.com

### Visit us online:

[www.heraeus-photovoltaics.com](http://www.heraeus-photovoltaics.com)  
[www.heraeus-renewables.com](http://www.heraeus-renewables.com)  
[www.heraeus-photovoltaics.cn](http://www.heraeus-photovoltaics.cn)  
[www.heraeus-renewables.cn](http://www.heraeus-renewables.cn)

Follow us on our Chinese WeChat!

