PV Back-Surface Tabbing Silver **9926-E**

Excellent Performance and Coverage

- **Excellent Cost Savings Through Lower Lay Down**
- **High Coverage - Up to 275 cm^2/g**
- **Pure Silver**
- **Best Performance Balance of ESL's High Coverage Back-Surface Tabbings**
- **High Efficiency**
- **Excellent Adhesion**
- **Excellent Solderability**
- **Excellent Printability**
- **Co-fireable with Back-side Aluminum and Front-side Silver Pastes**

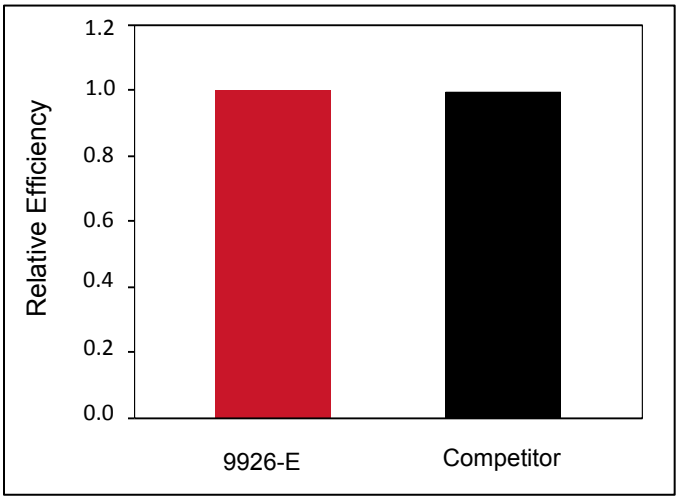
High-Coverage Low Lay-Down Tabbing Conductor for Silicon Photovoltaic Cells

ESL's new back-side metallization paste reduces user cost without sacrificing performance. The paste offers high efficiency, excellent adhesion, excellent solderability, excellent printability, and is co-fireable with industry standard front-side silver and backside aluminum metallizations. Currently, the paste is available as pure silver, but aluminum-doped compositions are available upon request.

Following the successful development and marketing of several back-side metallizations, ESL's Research and Development team has used new and innovative research to reduce silver content. The paste offers, in addition to high coverage, excellent printability, solderability, and adhesion to both mono and polycrystalline silicon solar cell wafers.

Efficiency

HP-S125 (600066) cells are prepared using 9926-E in conjunction with industry standard front-side metallization and aluminum pastes. The efficiency is characterized using Solar Simulator SS200 ABA (Photo Emission Tech). Within 99% confidence level, the performance of 9926-E is equal to the competitors' materials with higher solids content.



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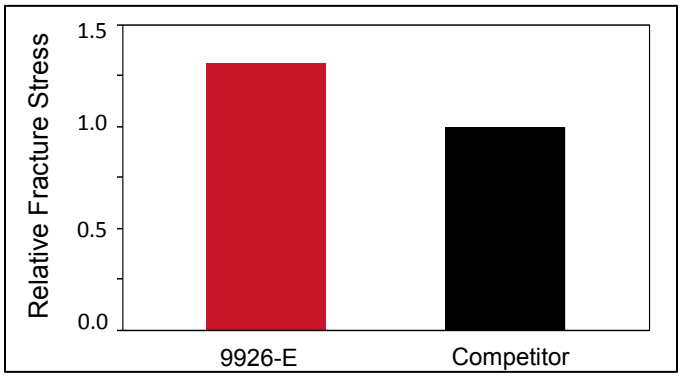
See Caution and Disclaimer on Other Side

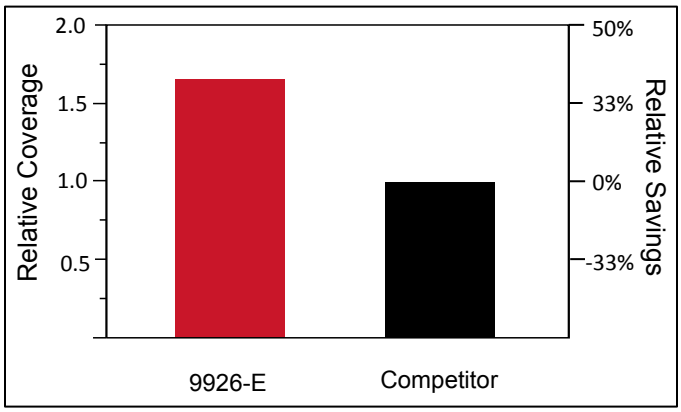
Adhesion and Solderability

Adhesion test is performed by attaching Ulbrich solder-coated copper ribbon (1.5 mm wide, 0.15 mm thick) to span 2 bonding pads 6 mm in length and separated by a 2 mm gap. The ribbon is peeled at 45° angle using a motorized test stand and calibrated force gauge. Typical adhesion strength for a 3.0µm fired film is 5.4N average with a min-max range of 4.2N- 6.8N. The fracture stresses shown below are normalized for a 2.0mm wide ribbon for comparison.



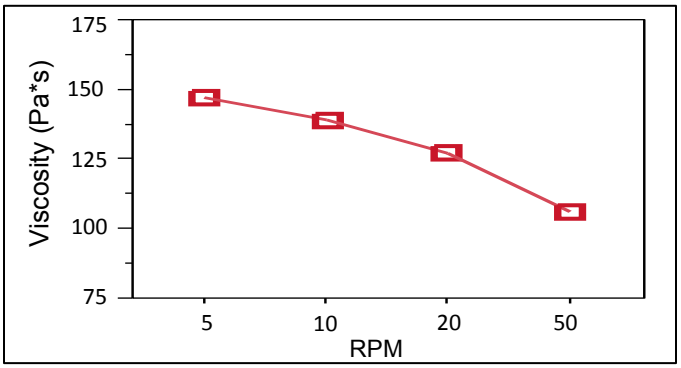
Coverage

With rising costs of silver, ESL's objective was to develop a product with lower silver content, while maintaining a competitive performance. Increased paste coverage directly translates to reduced paste consumption, and a reduction in cost per cell. 9926-E has a solids content of 53±1.5% and its coverage values can reach 275 cm^2/g.



Other Typical Properties

Viscosity



The rheology of 9926-E is excellent for high-speed screen printing. Reported viscosity is measured with Brookfield RVT viscometer with an ABZ spindle.

Solderability

Excellent wetting in:

- 2 second dip at 220 °C
- 62/36/2 Sn/Pb/Ag and Pb free

Recommended Processing Guide

Printing:

- 180-325 mesh
- 25-46 µm wire
- 5-25 µm emulsion

Drying: Typically dried at 125°C for 10 minutes. Drying time can be reduced to < 1 min in an IR dryer set at ~250°C.

Firing Profile: