FERRO
ELECTRONIC MATERIAL SYSTEMS

Photovoltaic Materials

53-038
Aluminum Conductor

Description: Ferro Corporation offers a full range of thick film inks for contacting the back surface of silicon solar cells. The most common class of materials for bus bar and grid applications is an aluminum-doped silver formulation. The purpose of the aluminum is to reduce the ohmic contact resistance between the thick film material and the p-doped silicon surface. The other classes of back surface metallizations offered are pure aluminum inks. These inks, which come in fritted and unfritted versions, are used to form a p+ back surface field layer. A variety of configurations and process sequences can be accommodated by combinations of our product offerings.

53-038 aluminum paste is specially designed for use as an ohmic contact to p-doped silicon in photovoltaic device fabrication. It forms an effective back surface field on crystalline silicon photovoltaic devices. The material has been optimized with respect to dramatically reduced Al bead formation during the firing process. The product is lightly fritted and can be fired over a broad range of conditions.

Processing Recommendations

Printing: 200 – 325 mesh screen with a 20 μm – 25 μm emulsion thickness is recommended.

Drying: The ink can be dried in an Infrared or conventional dryer under wide range of conditions. Inks are typically dried in a IR dryer with set points of 250°C – 300°C in less than 20 seconds.

Thinning: Thinning is not recommended, since the paste is supplied at the correct viscosity for application. Contact your local Ferro Representative for appropriate solvent details, should thinning become necessary to replace solvent lost through evaporation.

Paste Storage & Shelf Life: The paste should be stored in tightly capped containers, in a cool, dry place away from direct sunlight. Properly stored material will have a shelf life in excess of 6 months.

Typical Properties	
	53-038
Viscosity (poise)[1]:	300 – 500
Fineness of Grind:	< 37 μm
Dried Thickness:	30 – 40 μm
Fired Thickness:	25 – 35 μm
Wet Deposit (grams/square inch):	0.065
Drying Profile:	250 – 300°C, < 20 seconds
Peak Firing Temp:	680 – 750°C
Time at Peak:	1 – 20 seconds
Recommended Thinner	0804

Notes:
[1]Viscosity as measured on Brookfield model HBT cone/plate viscometer; 9.6 reciprocal seconds, 1.565"cone, 25°C.

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