

DuPont™ Solamet® PV18A

photovoltaic metallization

Preliminary Technical Data Sheet

Product Description

DuPont™ Solamet® PV18A photovoltaic metallization front side paste is a highly conductive silver composition with innovative material science, which enables contact to Enhanced LDE, designed to provide excellent efficiency, enhanced soldered adhesion and improved fine line capability. This paste is able to be co-fired with back side (p-type) aluminum conductors such as DuPont™ Solamet® PV3xx and DuPont™ Solamet® PV5xx tabbing silvers. It is designed for rapid dry and fast (spike) firing.

Product Benefits

- Improved efficiency over DuPont™ Solamet® PV17x family
- Reduced carrier recombination at Ag/Si interface
- Suitable for any emitter but achieves optimum performance on Enhanced LDE cells
- Optimized for low stress and high soldered adhesion
- Excellent solderability and consistent soldered adhesion
- Fast drying and firing
- Excellent ink transfer capability at fine line design
- High electrical conductivity after firing
- Cadmium free*

*Cadmium 'free' as used herein means that cadmium is not an intentional ingredient and is not intentionally added to the referenced product. Trace amounts however may be present.

Processing Summary

- **Application**
Standard screen print process
- **Printing**
Speed 6–10 in/sec (150–250 mm/sec)

All values reported here are results of experiments in our laboratories intended to illustrate product performance potential with a given experimental design. They are not intended to represent the product's specifications, details of which are available upon demand.

Screen Type

290, 360 or 400 mesh SS preferred for $\leq 70 \mu\text{m}$

	(I)	(II)	(III)	(IV)
Mesh (stainless steel)	290	325	400	360
Wire Diameter (μm)	20	23	18	16
Mesh Thickness (μm)	25–31			18–22
Emulsion Thickness (μm)	15–25			20–25
Mesh Angle (degrees)	22–30			22–30

Drying

Vertical Dryer 170–230°C 10 minutes

IR Belt Dryer 150–300°C 1 minute

Flexible in accordance with industry practice. Actual settings to be determined by dryer type

Typical Line Resolution

40–100 μm screen designed width

Soldering

Compatible with industry standard material and condition

Flux type: non-clean, reactivity level L0/M0 (Standard: ANSI/J-STD-004)

Ribbon: compatible with Pb contained and Pb free solder material, i.e. 60Sn/40Pb, 62Sn/36Pb/2Ag, 96.5Sn/3.5Ag

Table 1: Typical Physical Properties

Viscosity (Pa·s) (Brookfield HBT, 10 rpm SC4-14/6R utility cup and spindle, 25°C)	280–410
Solids (%) at 750°C	89.5–91
Fineness of Grind (4 th /50%)	$\leq 16\mu\text{m}/\leq 8\mu\text{m}$
Resistivity ($\text{m } \Omega/\text{sq}/10\mu\text{m}$)	<5
Thinner	9450
Shelf Life (months)	6



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Paste Preparation

The composition should be thoroughly mixed before use. The best mixing process can be achieved by jar rolling at 20~30 rpm for 24 hours. Care should be taken to avoid air entrapment.

Printing

Printing should be carried out in a clean, well-ventilated area. DuPont™ Solamet® PV18A photovoltaic composition, in its container, should be at ambient temperature prior to commencement of printing.

Firing

Solamet® PV18A is designed for rapid (spike) firing. Thermal budget above 600°C should be kept to minimum, ideally <8 seconds to ensure optimum electrical contact to the wafer. To get the best electrical performance, PV18A should be fired at a peak temperature similar to Solamet® PV17x. Firing optimization is strongly recommended.

See **Chart 1** for typical firing profile.

Actual furnace settings and belt speed will depend on the wafer thickness, texturing and emitter resistivity as these influence the temperature of the wafer during firing.

It is important that wafers are fired in a well ventilated furnace, with a continuous supply of clean filtered air. Air-flow and extraction rates should be optimized to ensure that oxidizing conditions exist within the furnace firing chamber, especially when front and backside conductors are co-fired.

Thinner

Solamet® PV18A composition is optimized for screen printing and thinning is not normally required. Use the DuPont recommended thinner for slight adjustments to viscosity or to replace evaporation losses. The use of too much thinner or the use of a non recommended thinner may affect the rheological behavior of the material and its printing characteristics. Please refer to **Table 1**.

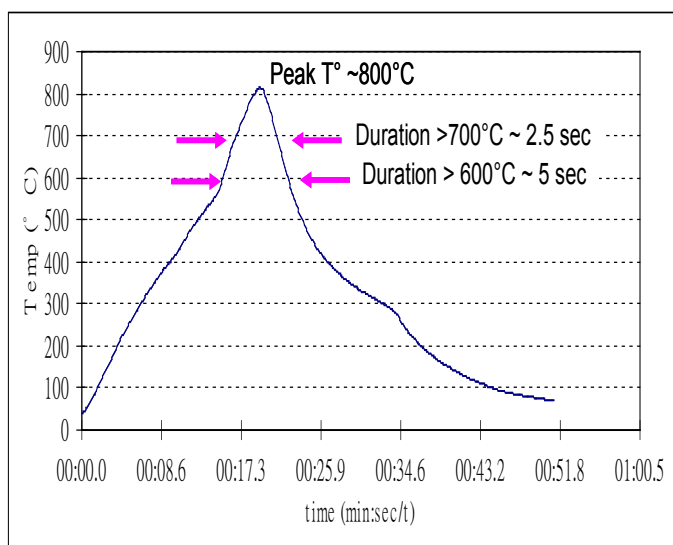
Storage and Shelf Life

Containers may be stored in a clean, stable environment at room temperature (between 5°C–25°C) with their lids tightly sealed. Storage in high temperature (>25°C) or in freezers (temperature <0°C) is NOT recommended as this could cause irreversible changes in the material.

Safety and Handling

For information on health and safety regulations please refer to the specific product MSDS.

Chart 1
Typical Firing Profile



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