DUPONT™ SOLAMET® PV19B

PHOTOVOLTAIC METALLIZATION

PRODUCT DESCRIPTION

DuPont™ Solamet® PV19B photovoltaic metallization front side paste is a highly conductive silver composition, part of the PV19x family, with innovative material science which enables finer line design and excellent printability. 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® PV19A
- Excellent ink transfer capability at fine line design
- High electrical conductivity after firing
- Excellent printability improving overall process yield
- Reduced carrier recombination at Ag/Si interface
- Optimized for low stress and high soldered adhesion with excellent solderability
- Fast drying and firing
- Cadmium free*

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

PROCESSING SUMMARY

Application

Standard screen print process

Printing

Speed: 200 – 350 mm/sec

Screen Types

290, 325, 400 or 360 mesh stainless steel preferred for <50um
High open ratio screens with heavy calendar preferred for <35um

	(I)	(II)	(III)	(IV)
Mesh (stainless steel)	290	325	400	360
Wire Diameter (µm)	20	16	18	16
Mesh Thickness (µm)	17 – 30			
Emulsion Thickness (µm)	12 – 20			
Mesh Angle (degrees)	22 – 30			

Drying

Vertical Dryer 170 – 230°C 10 minutes
IR Belt Dryer 150 – 400°C 1 min
Flexible in accordance with industry practice. Actual settings to be determined by drier type

Typical Line Resolution

30 – 50µm screen designed width

Soldering

Compatible with industry standard material & 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

Test	Properties
Viscosity (Pa.S) (Brookfield HBT, 20rpm, SC4-14/6R utility cup and spindle, 25°C)	130 – 250
Solids (%) at 750°C	90 – 92
Fineness of Grind (4th / 50%)	<14µm / <8µm
Resistivity (m Ω /sq/10µm)	<5
Thinner	9450
Shelf Life (months)	6

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PASTE PREPARATION

The composition should be thoroughly mixed before use to ensure good printing performance. Several pre-treatment methods are recommended: a) Hand mixing thoroughly; b) Thinky 60-180 sec, temperature controlled at 25 – 35°C; c) Jar rolling 12-48 hours under 30 rpm. Jar rolling over 48 hours is not recommended due to changes in rheological behavior. Care should be taken to avoid air entrapment.

PRINTING

Printing should be carried out in a clean, well-ventilated area. Solamet® PV19B photovoltaic composition, in its container, should be at ambient temperature prior to commencement of printing.

FIRING

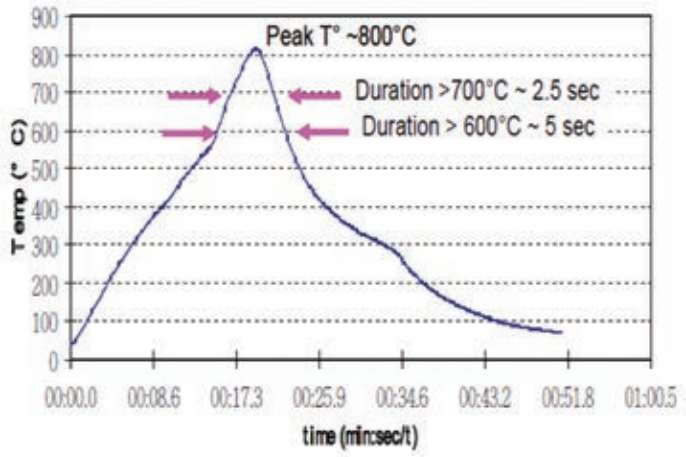
Solamet® PV19B is designed for rapid (spike) firing. Thermal budget above 600°C should be kept to a minimum, ideally <8 seconds to ensure optimum electrical contact to the wafer. To get the best electrical performance, PV19B should be fired at a peak temperature similar to Solamet® PV18x. Firing optimization 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. Airflow and extraction rates should be optimized to ensure that oxidizing conditions exist within the furnace firing chamber, especially when front and back side conductors are co-fired.

Chart 1. Typical Firing Profile



THINNER

Solamet® PV19B 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

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.

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FOR MORE INFORMATION ON DUPONT™ SOLAMET® PV19B OR OTHER DUPONT DUPONT PHOTOVOLTAIC SOLUTIONS, PLEASE CONTACT YOUR LOCAL REPRESENTATIVE:

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