DuPont™ Solamet® PV701

photovoltaic metallizations

Preliminary Technical Data Sheet

Product Description

DuPont™ Solamet® PV701 photovoltaic metallization paste is a highly conductive silver composition, developed for via filling in silicon wafers to interconnect the front side grid with the back side using the Metal Wrap Through (MWT) cell designs. It is used as a via-fill and as a tabbing Ag with a one step printing process. This paste may be cofired with standard DuPont™ Solamet® front side silver such as DuPont™ Solamet® PV16X or PV17X series, back side (p-type) Aluminum conductors such as DuPont™ Solamet® PV3XX series. It can also be used in combination with the DuPont™ Solamet® PV36X series Aluminum conductors in the Local Back Surface Field (Local BSF) cell design. It is designed for rapid and very fast (spike) firing.

Product Benefits

- Designed for Metal Wrap Through (MWT) cell designs
- Suitable for via filling and tabbing Ag for n- and p-contact
- Fast drying and firing
- Compatible with passivation layers (SiNx) in rear side passivated cell designs
- Low electrical resistivity after firing
- High shunt resistance
- Excellent solderability and soldered adhesion
- Compatible with PV36X Al for Local Back Surface Field (Local BSF) cell design
- Cadmium free*

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

Processing Summary

- **Application**
  Standard screen print process. For via filling, vacuum may be used if needed
- **Screen Type**
  165–325 mesh stainless steel with 10–14µm emulsion build up
- **Printing**
  Speed 6–8 in/sec (150–220 mm/sec)
- **Drying**
  Vertical Dryer 170–230°C 10 minutes
  IR Belt Dryer 220–270°C 30 seconds
  Flexible in accordance with industry practice. Actual settings to be determined by dryer type
- **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, such as 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)	240–300
Resistivity (m Ω/sq/10µm)	<3.5
Thinner	9450
Shelf Life (months)	6

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.

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Paste Preparation

The composition should be thoroughly mixed before use. This is best achieved by slow, gentle hand stirring with a clean burr-free spatula (flexible plastic) for 1–2 minutes. Jar rolling is NOT recommended, as this could change the rheology of the material. Care should be taken to avoid air entrapment.

Printing

Printing should be carried out in a clean, well-ventilated area. DuPont™ Solamet® PV701 photovoltaic composition, in its container, should be at ambient temperature prior to commencement of printing.

Firing

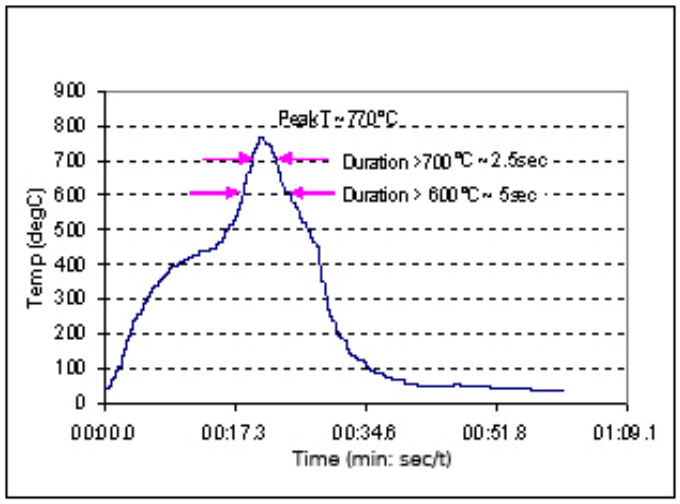
DuPont™ Solamet® PV701 photovoltaic metallization is designed for rapid (spike) firing. Thermal budget above 600°C should be kept to minimum, ideally <8 seconds to ensure optimum electrical contact to the wafer.

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 cofired.

Chart 1
Typical Firing Profile



Thinner

Solamet® PV701 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–30°C) with their lids tightly sealed. Storage in high temperature (>30°C) or in freezers (temperature <0°C) is NOT recommended as this could cause irreversible changes in the material. The shelf life of compositions in factory-sealed (unopened) containers between (5°C–30°C) is 6 months from date of shipment.

Safety and Handling

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

For more information on DuPont™ Solamet® PV701 photovoltaic metallizations or other DuPont Microcircuit Materials, please contact your local representative:

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