

# DuPont™ Solamet® PV412

photovoltaic metallization

## Technical Data Sheet

### Product Description

DuPont™ Solamet® PV412 photovoltaic metallization is a silver based polymer conductive paste designed to provide excellent front side conductivity for CIGS and other Thin Film solar cells.

### Product Benefits

- Low grid line resistance (Rgl)
- Fine line print capability
- Low contact resistance (Rc) to TCO
- Compatible with many TCO's
- Excellent 85°C/85% RH Stability (See Figure 1)

### Processing Summary

- **Screen Printing Equipment**  
Reel-to-reel, semi-automatic, manual
- **Substrate**  
Rigid/Flexible with sputtered/coated TCO
- **Screen Type**  
PET or Stainless Steel (325 mesh)
- **Typical Drying Conditions**  
Substrate/cell dependent, 130–170°C/5–60 min
- **Typical Circuit Line Thickness**  
15 µm for a track width around 150 µm (using a 325 mesh SS screen)
- **Clean up Solvent**  
Ethylene Glycol diacetate

### 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.

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.

**Table 1**  
**Typical Composition and Physical Properties**

Test	Properties
Solids (%) at 750°C	79.5–82.5
Viscosity (Pa·s) (Brookfield RVT, spindle #14, 10rpm)	45–75
Thinner	8210
Resistivity (mΩ/sq/25µm)	≤22
Coverage, cm <sup>2</sup> /g	120
Abrasion Resistance (ASTM Pencil Hardness)	2H
Solderability	Not Recommended

### Drying

Depending on the temperature tolerance of the cell and substrate, Solamet® PV412 can be dried at temperatures between 130°C and 170°C. Drying times can vary depending on the efficiency of the dryer. Longer drying times and higher drying temperatures will improve the adhesion, resistivity and abrasion resistance.

### Printing

Printing should be carried out in a clean, well-ventilated area. DuPont™ Solamet® PV412 photovoltaic composition, in its container, should be at ambient temperature prior to commencement of printing.

### Thinner

This composition is optimized for screen printing, 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. Refer to the table.

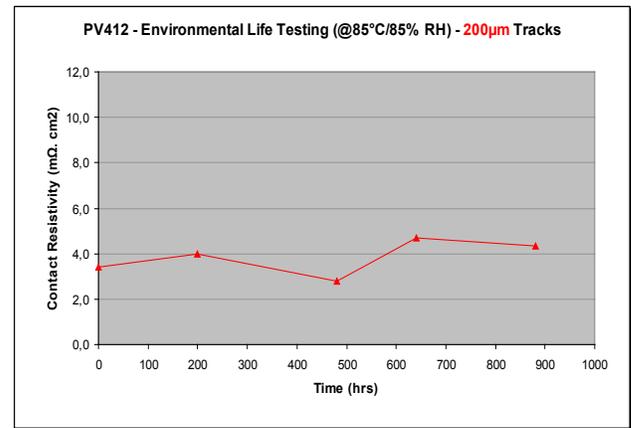
## Storage and Shelf Life

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) conditions is 6 months from date of shipment.

## Safety and Handling

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

Figure 1–85°C/85% RH Stability



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