DuPont Photopolymer & Electronic Materials

Ceramic Circuit Materials and Technologies

6146 Pd/Ag Co-fire Conductor

Green Tape* System

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.

Product Description

6146 is a co-fire top layer Pd/Ag conductor composition which is applied by screen printing. It has been developed to be compatible with DuPont 951 Low-Temperature Co-fired Dielectric Tape.

Key Features :

- ❑ Co-fire processing
- ❑ Excellent solder acceptance
- ❑ Good Al wire bondability
- ❑ High reliability
- ❑ High yield

Design Notes

Properties are based on laboratory data using recommended processing procedures for manufacturing test vehicles.

To achieve the required fired thickness screen mesh counts of 200-400 mesh stainless steel have been found to be suitable.

Recommended processing procedures for Tape, are detailed in the 951 Low-Temperature Cofire Dielectric Tape technical data sheet. (L-11590)

Composition Properties

Viscosity [Pa.s] Brookfield HAT, Utility cup & spindle (SC4-14/6R), 10rpm, 25°C ± 0.2°C	**130 - 230**
Coverage[cm²/g] (Based on a fired film thickness of 10 - 12µm)	**95 - 105**
Thinner	**8250**

Processing Conditions

Printing	325 mesh stainless steel screen (28µm Ø wire; 12µm emulsion build up)
Drying	Allow prints to level for 5 -10 minutes at room temperature, then dry for 5 minutes at 120°C
Firing	Consult 951 technical data sheet

Typical Fired Properties

Print Resolution [µm]	**125**	
Fired Thickness [µm]	**10 - 12**	
Resistivity [mΩ/□/12µm]	**< 50**	
Adhesion [N] (aged @ 150°C for 48hr)	**>20**	
Solder Acceptance[%] (5s dip, 240°C)	**>98**	
Wire Bonding	initial	1000hr@150°C
250µm Al wire [g]	**>500**	**>450**

Compatibility

Whilst DuPont has tested this composition with the materials specified above and the recommended processing conditions, it is impossible or impractical to cover every combination of materials, customer processing conditions and circuit layouts. It is therefore essential that customers thoroughly evaluate the material in their specific situations in order to completely satisfy themselves with the overall quality and suitability of the composition for its intended application(s).

Recommended Processing Procedure

Storage

Containers may be stored in a clean, stable environment at room temperature (< 25°C), with their

lids tightly sealed. Storage in freezers (temperature < 0°C) is NOT recommended as this could cause irreversible changes in the material.
For guidance regarding storage of material, please consult DuPont Technical Note EUT 7.2 “Shelf Life Policy”.

Shelf life
This composition has a shelf life of 6 months from date of shipment for factory-sealed (unopened) containers, stored under room-temperature conditions.

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 behaviour of the material and its printing characteristics. Refer to table - “Composition Properties”

Printing
The composition should be thoroughly mixed before use. This is best achieved by slow, gently, hand stirring with a clean burr-free spatula (flexible plastic or stainless steel) for 1-2 minutes. Care must be taken to avoid air entrapment.
Printing should be performed in a clean and well ventilated area. Additional information on requirements for printing areas is contained in DuPont Technical Guide EUT 7.3 “Processing - Screen Printing Rooms”, available on request.
Note: optimum printing characteristics are generally achieved in the room temperature range of 20°C-23°C. It is therefore important that the material, in its container, is at this temperature prior to commencement of printing.
Class 10,000 printing area is recommended for building complex hybrids and multilayer circuits, otherwise severe yield losses could occur. Refer to table - “Processing Conditions”

Drying
Allow prints to level at room temperature, then dry in a well ventilated oven or conveyor dryer. Refer to table - “Processing Conditions”

Firing
Consult 951 Low-Temperature Cofire Dielectric Tape technical datasheet (L-11590) for firing details.
Fire in a well ventilated belt, conveyor furnace, or static furnace. Air flows and extraction rates should be optimized to ensure that oxidizing conditions exist within the muffle, and that no exhaust gases enter the room.
For further information on requirements for firing is contained in DuPont Technical Guide EUT 7.4 “Process Guide - Firing”.

General
Performance will depend to a large degree on care exercised in screen printing. Scrupulous care should be taken to keep the composition, printing screens and other tools free of metal contamination. Dust, lint and other particulate matter may also contribute to poor yields.

Health/Safety considerations
DuPont thick film compositions are intended for use in an industrial environment by trained personnel. All appropriate health / safety regulations regarding storage, handling and processing of such materials should be complied with. For information on health / safety regulations please refer to the specific product MSDS and to the DuPont Safety Guide EUT 7.1 “Practical Safe Handling of Thick Film Compositions”.