



5029 Polymeric Silver For Smartcard Application

Polymer Thick Film Composition

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

5029 is a silver composition designed for the printing of coils in smartcard and RFID tags.

Key Features

- High conductivity
- High print thickness in a single print

Processing

- Screen Printing Equipment**
Reel to reel, semi-automatic or manual
- Substrate**
Polyester , PVC, Polycarbonate, ABS, Polyimide
- Screen Type**
200 mesh stainless steel or 62T polyester screen
- Typical Circuit Line Thickness**
200 mesh stainless steel /15µm emulsion build up to achieve line thickness of 20-30µm
62T polyester screen / 20µm emulsion build up to achieve line thickness of 18-22µm
- Typical Cure Conditions Conveyor Oven**
PVC substrates 15-30 minutes, at a peak temperature 50-60°C
Polyester substrates 2-5 minutes, at a peak temperature 120-130°C
- Lamination**
This composition can be processed through standard card lamination processor. These processes significantly reduce the achieved resistance
- Clean up solvent**
Ethylene Glycol Diacetate

Compatibility

Whilst DuPont has tested this composition with the materials specified above and the recommended

Composition Properties

Viscosity (Pa.s) Brookfield RVT, Utility cup & spindle (SC4-14/6R), @ 10 rpm, 25°C ± 0.2°C	35 - 50
%Solids after cure	82 - 86
Coverage (cm²/g) 200 mesh stainless steel /15µm emulsion	60 - 80
Thinner	3610

Typical Physical Properties

Sheet Resistivity* [mΩ/□]	
After Drying	15-25
After Lamination	4-8

* Sheet resistivity; line thickness 25µm , substrate 160µm PVC.

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).

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.

The screen and emulsion thickness will strongly influence the thickness and definition of the printed circuit. Typically, polyester screens (62T-77T) with 20-25µm thick emulsion are employed resulting in a final cured thickness of 15-25µm for 5029. Stainless steel screens may also be employed and will result in higher definition and thicker prints at a given mesh count. This will affect the achieved resistance.

Normally only one print is needed to achieve the thickness. For very thick tracks, multiple prints may be utilised. In this case there should be an intermediate drying stage.

For designs with very fine lines at 150µm or less then the screen should be selected to give a thinner print as such line cannot be resolved consistently with thick prints.

The printer conditions should be set to maximise the print thickness. This means using a high print speed and setting a low squeegee pressure. Typically this paste can be printed at speeds from 30-60 cm/s.

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.

Curing

Cure in a well ventilated belt or conveyor furnace. Air flows and extraction rates should be optimized to ensure the complete removal of solvent from the paste.

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.

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"

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.

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".

This information corresponds to our current knowledge on the subject. It is offered solely to provide possible suggestions for your own experimentation. It is not intended, however, to substitute for any testing you may need to conduct to determine for yourself the suitability of our products for your particular purposes. This information may be subject to revision as new knowledge and experience become available. Since we cannot anticipate all variations in actual end-use conditions, DuPont makes no warranties and assumes no liability in connection with any use of this information. Nothing in this publication is to be considered as a license to operate under or a recommendation to infringe any patent right. **Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see "DuPont Medical Caution Statement" H-50102.**