

# 5028 Silver Conductor

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.

## Product Description

Silver conductor 5028 is used to fabricate low-voltage circuitry, especially on flexible substrates. This composition is particularly suited for applications requiring high conductivity and/or fast curing. It can be used with reel-to-reel, semiautomatic, and manual printers, and offers excellent residence time on the screen.

## Product Benefits

- Slightly lower solids than 5029

## Processing

- Screen Printing Equipment**  
Reel-to-reel, Semi-automatic, manual
- Ink Residence Time on Screen**  
>1 hours
- Screen Types**  
Polyester, stainless steel
- Typical Cure Conditions**  
Box oven: 120 - 130°C for 6 minutes  
Reel-to-reel: 140°C for 1-1.5 minutes
- Typical Circuit Line Thickness Printed with 325-mesh Stainless Steel Screen**  
8-10 microns
- Clean up Solvent**  
Ethylene glycol diacetate
- Substrate**  
Polyester, paper, epoxy glass

## Storage and Shelf Life

DuPont thick film polymeric compositions should be stored at ambient temperatures. Shelf life of material in unopened containers is six months from ship date. Some settlings of solids may occur, so compositions should be stirred thoroughly before use.

Table 1  
Typical Physical Properties  
on 5-mil Polyester Film

Sheet Resistivity (mΩ/sq/mil)	≤ 12
Resistivity after Flex(mΩ/sq/mil) 15 sec after test Crease (180°, 1 cycle)	<100
Abrasion/Tape Pull (3M Scotch Tape #810)	No Ag Transfer
Abrasion Resistance, Pencil Hardness (H) (ASTM D3363-74)	≥ 2H
Operating Use Temperature (°C)	≤ 90
Solderability	Not Recommended
Change in Physical Properties After Environmental Test†	Insignificant
Change in Electrical Properties After Environmental Tests†	<10%

### †Environmental Tests

- Thermal Shock (+85°C to -40°C, 30 min, each, 5 cycles)
- Dry Heat (+85°C, 20 days)
- Humidity (+60°C, 95% RH, 1,000 hr) [MIL Standard 202E, method 103, cond. A]
- Salt Spray (+35°C, 5% salt, 10 days) [ASTM B117]
- Silver Migration (1V DC/mil gap, +40°C, 90% RH, 500 hr, tested on 40- and 7-mil gaps)
- Sulfur Dioxide (+45°C, 90% RH, 500 hr in a 9-liter chamber containing 500 mg of flowers of sulfur)

## Dry

Dry and cure in a well ventilated oven or conveyor dryer where the exhaust meets environmental regulations. See Safety & Handling section for additional information.

## Safety and Handling

DuPont thick film products are intended for industrial use by trained personnel. These products contain organic and inorganic ingredients. It is important for workers to avoid overexposure to chemicals contained in these products or that might become available when processing them. Overexposure to other materials used in the operation should also be avoided, for example, cleaning solvents and degreasing fluids.

Well-designed area and personal air sampling/analysis can show if exposures are within required and recommended limits. Properly designed engineering controls, such as local ventilation and process enclosures, are effective in limiting employee exposure and to avoid the creation of hazardous conditions (e.g. forming an explosive vapor concentration). Engineering controls and procedures must comply with all applicable federal, state and local safety, health and environmental laws and regulations.

The following additional precautions should be taken when handling these products:

- Read the Material Safety Data Sheet (MSDS) and product labels before using the products;

Viscosity (Pa.S) (Brookfield HBT, 10 rpm #14 spindle, 25°C)	15 - 30
Solids (150°) (%)	73 - 79
Coverage (cm <sup>2</sup> /g) (Dependent on screen Size and material)	230-120
Thinner	3610

- Use appropriate personal protective equipment (PPE) and practice good industrial hygiene. DO NOT INGEST! DANGEROUS IF SWALLOWED!
- Keep product container closed when not in use to prevent solvent evaporation and spilling hazards;
- If contact with skin occurs, wash affected area immediately with soap and water
- Avoid prolonged breathing of vapors and dusts/particulates. Keep exposure levels within the required or recommended limits. Always use sufficient ventilation as noted above.

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### United States

DuPont Microcircuit Materials  
14 T.W. Alexander Drive  
Research Triangle Park, NC 27709  
Tel.: 800-284-3382

### Europe

DuPont (UK) Limited  
DuPont Microcircuit Materials  
Coldharbour Lane  
Bristol BS16 1QD  
England  
Tel.: 44-117-931-1444

### Japan

DuPont Kabushiki Kaisha  
ARCO Tower  
8-1, Shimomeguro 1-Chome  
Meguro-ku, Tokyo 153-0064  
Japan  
Tel.: 81-35-434-6573


Visit our website at: <http://www.dupont.com/mcm>

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**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

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