



# DUPONT™ AS320 SILVER CONDUCTOR

## DESCRIPTION

The Dupont™ AS series of thick film pastes is suitable for applications where thermal management is crucial to performance of the circuit.

AS320 is a silver paste for screen printing of thermal vias on aluminium substrates and heat sinks in order to improve thermal conductivity underneath LED lighting and power components.

## KEY FEATURES

- High solder adhesion
- Excellent thermal conductivity
- Low temperature firing process <510°C.
- High operating temperatures (>220°C).
- Patternable, additive process for lower material costs.
- Compatible with dielectric paste (AS100) and silver conductor (AS300) pastes.

## PROCESSING SUMMARY

### Screen type

- 200 mesh stainless steel screen with 12 µm emulsion buildup

### Drying

- Allow prints to level for 10 minutes at room temperature for ≥ 10 minutes at 150°C

### Firing

- 2-3 minutes over peak temperature of 500°C with a total time of 45-50 minutes in an air atmosphere.

## 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).

## 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 3 months from date of shipment.

## SUBSTRATES

Substrates of different compositions and from various manufacturers may result in variations in performance properties.

**Table 1. Typical Physical Properties**

Property	Value
Viscosity (Pa.S) Brookfield UC&S SC-14 @ 10 RPM, 25°C	85-115
Coverage (cm <sup>2</sup> / g) at total fired thickness of 14 µm	55-65
Thinner	4553
Shelf life (months)	3

## THINNER

AS300 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.

## PRINTING

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 or stainless steel) for about 1-2 minutes. Care must be taken to avoid air entrapment. Printing should be performed in a 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.

# DUPONT™ AS320 SILVER CONDUCTOR

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 the 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 'Processing Summary'.

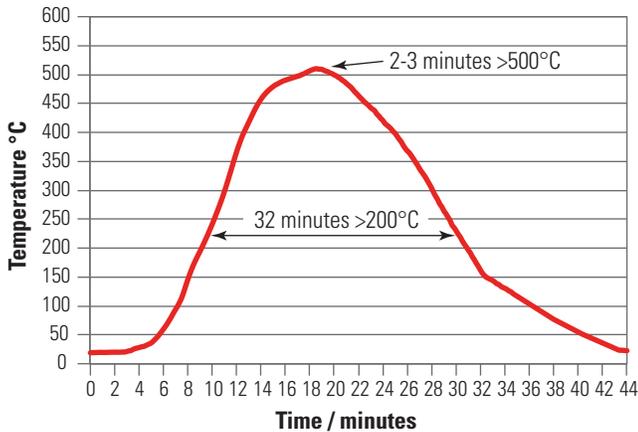
## DRYING

Allow prints to level at room temperature, then dry in a well ventilated oven or conveyor dryer. Refer to 'Processing Summary'.

## FIRING

Fire in 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. Full information on requirements for firing is contained in DuPont Technical Guide EUT 7.4 'Process Guide-Firing'. Refer to 'Processing Summary'.

Figure 1. Recommended Firing Profile



## 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 materials may also contribute to poor yields.

## SAFETY AND HANDLING

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'.

Table 2. Typical Fired Properties

Property	Value
Fired Thickness <sup>1</sup>	15-20 µm
Electrical Resistivity <sup>1</sup>	< 1.3 mΩ/ sq @25 µm thickness
Solder adhesion <sup>2</sup>	> 20 N

## Test procedure

<sup>1</sup> Printed with 200 mesh stainless steel mesh/12 µm EOM, fired for 7-9 minutes @ peak temperature of 450°C with a total time of 75-90 minutes in an air atmosphere

<sup>2</sup> AWG 20 Tin plated copper wire, solder 95.5/3.8/0.7 (Sn/Ag/Cu), pad size 2 x 2 mm.



## DUPONT™ AS320 SILVER CONDUCTOR

**FOR MORE INFORMATION DUPONT MICROCIRCUIT MATERIALS, PLEASE CONTACT YOUR LOCAL REPRESENTATIVE:**

### **Americas**

DuPont Microcircuit Materials  
14 TW Alexander Drive  
Research Triangle Park, NC 27709  
USA  
Tel +1 800 284 3382 (calls within USA)  
Tel +1 919 248 5188 (calls outside USA)

### **Europe, Middle East & Africa**

Du Pont (UK) Ltd  
Coldharbour Lane  
Bristol BS16 1QD  
UK  
Tel +44 117 931 3191

### **Asia**

Du Pont Kubushiki Kaisha  
MCM Technical Lab  
DuPont Electronics Center  
KSP R&D B213  
2-1, Sakado 3-chom, Takatsu-ku,  
Kawasaki-shi, Kanagawa, 213-0012  
Japan  
Tel +81 44 820 7575

DuPont Taiwan, Ltd.  
45 Hsing-Pont Road  
Taoyuan, Taiwan 330  
Tel: 886-3-377-3616

DuPont China Holding Company Ltd  
Bldg. 11, 399 Keyuan Road  
Zhangjiang Hi-Tech Park  
Pudong New District  
Shanghai 201203  
Tel +86 21 6386 6366 ext. 2202

DuPont Korea Inc.  
3-5th Floor, Asia tower #726  
Yeoksam-dong, Gangnam-gu  
Seoul 135-719, Korea  
Tel +82 10 6385 5399

E.I. DuPont India Private Limited  
7th Floor, Tower C, DLF Cyber Greens  
Sector-25A, DLF City, Phase-III  
Gurgaon 122 002 Haryana, India  
Tel +91 124 409 1818

Du Pont Company (Singapore) Pte Ltd  
1 HarbourFront Place, #11-01  
HarbourFront Tower One  
Singapore 098633  
Tel +65 6586 3022

**[www.mcm.dupont.com](http://www.mcm.dupont.com)**

*This information corresponds to our current knowledge on the subject. It is offered solely to provide possible suggestions for your own experimentations. 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 becomes available. Since we cannot anticipate all variations in 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-50102-4.*

*Copyright © 2014 DuPont. All rights reserved. The DuPont Oval Logo, DuPont™, and all DuPont products denoted with © or ™ are registered trademarks or trademarks of E. I. du Pont de Nemours and Company or its affiliates. K-28454 09/14*