



# DUPONT AS100

## DIELECTRIC

### PRODUCT DESCRIPTION

The DuPont™ AS series of thick film pastes is suitable for applications where thermal management is crucial to performance of the circuit. AS100 is a dielectric paste for screen printing of insulating layers directly onto aluminum substrates and heat sinks for construction of high thermally conductivity interfaces for LED lighting and power electronics components.

### KEY FEATURES

- Dense hermetic fired structure enables high breakdown voltages > 3.2 kV at low fired thickness of 35 µm
- Low temperature firing process <510°C
- High operating temperatures (>220°C)
- Patternable, additive process for lower material costs
- Compatible with silver conductor (ASxxx) and thermal via fill (ASxxx) pastes
- Compatible with wide range of aluminum substrates

### 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 500–510°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**

Test	Properties
Viscosity (Pa.s) Brookfield UC&S SC-14 @ 10 RPM, 25°C	40–100
Coverage, (cm <sup>2</sup> /g) At total fired thickness of 14 µm	65–75
Shrinkage Dried to fired	33%
Thinner	DuPont 8250
Shelf Life (months)	3

**Table 2-Typical Fired Properties**

Test	Properties
Fired Thickness <sup>1</sup>	35 µm
Breakdown Voltage <sup>1</sup>	≥3200 Vdc
Thermal Conductivity <sup>2</sup>	1.6 W m <sup>-1</sup> K <sup>-1</sup>

Test Procedure

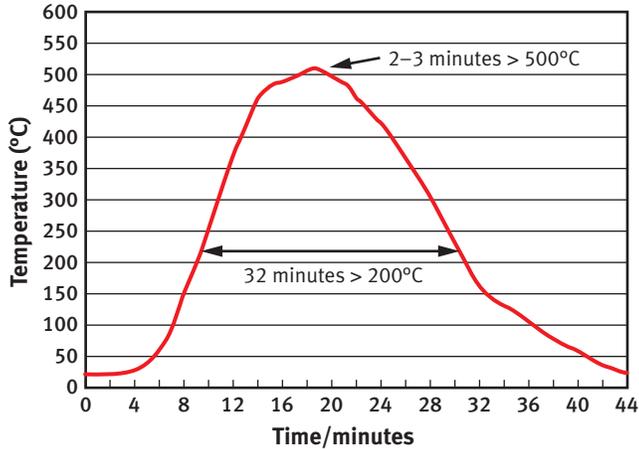
<sup>1</sup> 2 layers of dielectric printed with 200 mesh stainless steel/12 µm EOM, fired for 7–10 minutes @ peak temperature of 510°C with a total time of 75–90 minutes in an air atmosphere.

<sup>2</sup> Measured using Thermal Interface Materials (TIM) analysis

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## THINNER

AS100 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**.



**Recommended Firing Profile**

## 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.

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'.

## 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'.



## DUPONT AS100 DIELECTRIC

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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-50102-5 K-26870-3 (11/14)