DuPont LL601

Co-fired silver via fill

Technical Data Sheet

Product Description

DuPont LL601 is a silver via fill composition specifically designed for use in automated, high volume via fill processes incorporating faster squeegee print speeds and filling through a punchable backing carrier film. The material is compatible with DuPont™ GreenTape™ 9K7 low temperature co-fired ceramic (LTCC) tape and the cofired DuPont LL602 (ground plane), DuPont LL612 (signal line) and DuPont LL617 (solderable) silver based members of the material system. DuPont LL601 is cadmium and lead-free*.

Product Benefits

When used as the via fill in the GreenTape™ 9K7 LTCC system, DuPont LL601 offers the following benefits:

- Low cost, high conductivity metallization
- High volume, automated via fill processes
- Co-fire processing
- High frequency performance
- Cadmium and lead free*

*Cadmium and lead "free" as used herein means that cadmium and lead are not an intentional ingredients in and are not intentionally added to the referenced product. Trace amounts however may be present.

Processing

For detailed recommendations on the use of the DuPont LL601 via fill with the GreenTape™ 9K7 system, consult this data sheet and the GreenTape™ LTCC Design Guide. For compatible co-fired and post fired conductor compositions, consult the GreenTape™ 9K7 Product Selector Guide.

Printing

The composition should be thoroughly stirred prior to use. This is best achieved by a slow, gentle mixing by hand for 1 to 2 minutes using a clean, burr-free spatula (flexible plastic or stainless steel). Care must be taken to avoid air entrapment.

Typical Properties

Property	Value
Viscosity, (Pa.s, 10 rpm, 25° C)[1]	300 - 400
Solids, (%)[2]	94.0 - 95.0
Clean-up solvent	1-Propoxy-2-Proponal
Thinner	9450
Via diameter resolution, (um)	100
Resistivity, (mOhms/sq)[3]	</= 5

[1] Brookfield 2xHAT, SC4-14 / 6R spindle and utility cup
[2] 750° C
[3] Normalized to 10 um dry thickness

The above table shows the anticipated typical physical and electrical properties for DuPont LL601 are based on specific controlled experiments in our labs and are not intended to represent the product specifications, details of which are available upon request.

Prior to the via fill step, via openings are formed/ punched in the preconditioned GreenTape™ 9K7 green sheets per the applicable circuit design for each respective layer of the build.

Print DuPont LL601 directly into the open vias using typical through-hole screen printing methods and a stencil mask. The use of a vacuum stone or other support structure which uniformly distributes a vacuum across the green sheet is recommended to assist with the uniform fill of the via array patterns, as well as secure the green sheet to the printer's stage plate during the printing process.

Drying

Dry via prints in a well ventilated oven or conveyor dryer for 5 minutes at 100°C. Do not over-dry. An alternative drying method is to allow the via fills to dry 6 to 8 hours at ambient room temperature.

Lamination

Collate, stack and laminate multiple sheets of the printed circuit patterns according to the recommended processing parameters detailed in the DuPont™ GreenTape™ LTCC Design Guide.

Typical lamination parameters are 3000 psi at 70°C for 10 minutes. Lamination pressures may vary slightly based upon part design and the individual tape lot shrinkage factors.

Firing

Fire in a well ventilated conveyor 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.

GreenTape™ 9K7 requires the use of dedicated, specially coated setters in order to prevent parts from sticking during firing.

Consult the DuPont™ GreenTape™ 9K7 low temperature co-fired ceramic system data sheet and DuPont™ GreenTape™ LTCC Design Guide for additional details.

For further information regarding firing profiles, furnace recommendations and setter tile choices, please contact your local DuPont Technical Service Representative.

Storage and Shelf Life

Containers should be stored, tightly sealed, in a clean, stable environment at room temperature (<25°C). Shelf life of material in unopened containers is six months from date of shipment. Some settling of solids may occur and compositions should be thoroughly mixed prior to use.

Safety and Handling

For Safety and Handling information pertaining to this product, read the Material Safety Data Sheet (MSDS).

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