DuPont LF153

DIELECTRIC COMPOSITION

Technical Data Sheet

Product Description

DuPont LF153 is a filled, crystallizable screen-printed thick film dielectric composition and is an integral element of System LF. It is a lead free* dielectric intended for use in MCM (Multi-Chip Module) and hybrid interconnects applications.

Product Benefits

- Lead, Cadmium, Chromium and Nickel Free*
- Broad conductor compatibility (gold, silver and mixed metal)
- Compatible with cofirable conductors
- Highly resistant to EMF (electro-motive force) blistering and shorting
- Robust electrical and mechanical properties
- Dense, hermetic microstructure

*Cadmium, lead, chromium and nickel "free" as used herein means that these are not intentionally added to the referenced product. Trace amounts however may be present.

Design Note

The fired thickness of the dielectric layer should be at least 30 µm between the conducting layers this can be achieved with 2 prints of the dielectric. Each printed dielectric layer should be separately fire. Co-firing is not recommended.

Processing Conditions

Printing

230 to 280 stainless steel screen, at a print speed of 15cm/sec. (See design note).

Drying

Allow prints to level for 10-15 minutes at room temperature, and then dry for 10-15 minutes at 150°C.

Typical Physical Properties

Test	Properties
Viscosity (Pa.s) [Brookfield 2xHAT, UC&SP, 10 rpm, 25°C]	300-400
Coverage (cm^2/g)	110-130
Thinner	8250
Total Fired Thickness (mm)	> 30
Camber (mm/cm)[1]	<20
Dielectric Constant (@1KHZ)	8-10
Dissipation Factor (@1KHZ)	<0.5%
Leakage Current[2] [$\mu A/cm^2$]	<1
Insulation Resistance [30µm]	$>10^{12}$ @ 100VDC
Mean Breakdown Voltage [30µm]	>1.6kV
EMF Blister Resistance[3]	>30 firing

[1] Measured deflection of 5 in x 1 in substrate with 5 circuit layers, single sided.
[2] Standard measurements made after 5 minutes at 10VDC
[3] Maximum number of firing performed without blisters observed with Substrate/gold/dielectric/ dielectric/silver configuration.

This table shows anticipated typical physical properties for DuPont LF153 based on specific controlled experiments in our labs and are not intended to represent the product specifications, details of which are available upon request.

Firing

850°C peak held for 10 minutes on 30 minutes cycle in an air atmosphere.

Recommended Processing Procedure

Substrates

Properties are based on test on 96% alumina substrates. Substrates of different compositions and from various manufacturers may result in variation in performance properties.

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 behavior of the material and its printing characteristics. Refer to table 1.

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. Printing should be performed in a clean and well-ventilated area. 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.

Drying

Allow prints to level at room temperature, and then dry in a well-ventilated oven or conveyor dryer.

Firing

Fire in a well ventilated belt, conveyor furnace, or static furnace. Airflows and extraction rates should be optimized to ensure that oxidizing conditions exist within the muffle.

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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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