Micromax™ LL601

Electronic Inks and Pastes

Co-Fired Silver Via Fill

Micromax™ 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 Micromax™ GreenTape™ 9K7 low temperature co-fired ceramic (LTCC) tape and the cofired Micromax™ LL602 (ground plane), Micromax™ LL612 (signal line) and Micromax™ LL617 (solderable) silver based members of the material system. Micromax™ LL601 is cadmium, Lead, Nickel and Phthalate free*.

Product benefits

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

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

*Cadmium, Lead, Nickel and Phthalate 'free' as used herein means that cadmium, lead, nickel, and phthalate are not intentional ingredients in and are not intentionally added to the referenced product. Trace amounts however may be present.

Product information

Solvent or thinner	Micromax™ 9450	
Solid content	94 - 95[1]	%

[1]: 750 °C

Rheological properties

Viscosity	300 - 400[2]	Pa.s

[2]: Brookfield 2xHAT, UC&SP, SC4-14/6R, 10 rpm, 25 °C

Application technique

Drying time	5	min
Drying temperature	100	°C
Via, diameter resolution	100	µm

Electrical properties

Surface resistivity	≤5[3]	mOhm per square

[3]: normalized to 10µm dry thickness

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Storage and stability

Shelf life	6[4] months

[4]: in unopened containers, from date of shipment, at temperature <25 °C

Additional information

How to use

Processing features

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

Processing

- 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.
  - Prior to the via fill step, via openings are formed/punched in the preconditioned Micromax™ GreenTape™ 9K7 green sheets per the applicable circuit design for each respective layer of the build.
  - Print Micromax™ 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.
- Clean-up solvent
  - 1-Propoxy-2-Propanol
- 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 Micromax™ GreenTape™ LTCC Design Guide.
  - Typical lamination parameters are 3000 psi at 70 °C for 10 minutes. Lamination pressures may vary slightly based upon part

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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.
  - Micromax™ GreenTape™ 9K7 requires the use of dedicated, specially coated setters in order to prevent parts from sticking during firing.
  - Consult the Micromax™ GreenTape™ 9K7 low temperature co-fired ceramic system data sheet and Micromax™ GreenTape™ LTCC Design Guide for additional details.
  - For further information regarding firing profiles, furnace recommendations and setter tile choices, please contact your local Micromax™ Technical Service Representative.

Properties

- Information in this datasheet shows anticipated typical physical and electrical properties for Micromax™ LL601 based on specific controlled experiments in our labs and are not intended to represent the product specifications, details of which are available upon request.

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 Safety Data Sheet (SDS).

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