

Micromax™ LL612

Electronic Inks and Pastes

Co-Fired Silver Conductor

Micromax™ LL612 is a co-fireable internal and external silver signal line conductor for the Micromax™ GreenTape™ 9K7 low temperature co-fired ceramic (LTCC) material system. The composition is cadmium-free*.

Product benefits

When used with the Micromax™ GreenTape™ 9K7 LTCC system, Micromax™ LL612 will offer the following benefits:

- Low resistivity
- High yields and reliability
- Co-fire processing
- Cadmium free*

*Cadmium 'free' as used herein means that cadmium is not an intentional ingredient in and is not intentionally added to the referenced product. Trace amounts however may be present.

Product information

Solvent or thinner	Micromax™ 8250
Solid content	81.1 - 84.1 ^[1] %
[1]: 750 °C	

Rheological properties

Viscosity	150 - 300 ^[2] Pa.s
[2]: Brookfield 2xHAT, UC&SP, SC4-14/6R, 10 rpm, 25 °C	

Application technique

Mask mesh	325
Mask emulsion	10 - 12 µm
Drying time	5 min
Drying temperature	100 °C
Theoretical coverage	80 - 90 cm ² /g
Recommended film thickness, dried	15 - 18 ^[3] µm
Recommended film thickness, fired	9 - 12 ^[3] µm
Print resolution, lines	125 ^[4] µm
Print resolution, spaces	125 ^[4] µm
Leveling time	5 - 10 min

[3]: print thickness

[4]: Dried Line Resolution

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Electrical properties

Surface resistivity

$\leq 5^{[5]}$ mOhm per square

[5]: normalized to 15µm dry thickness

Storage and stability

Shelf life

6^[6] months

[6]: 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 Micromax™ LL612 and the Micromax™ GreenTape™ LTCC 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 for 1 to 2 minutes prior to use. This is best achieved by slowly stirring the paste by hand using a clean, burr-free spatula (flexible plastic or stainless steel). Care must be taken to avoid air entrapment.
- Print Micromax™ LL612 directly on preconditioned Micromax™ GreenTape™ 9K7 green sheets using appropriate thick film screen printing methods and a vacuum stone or other support structure which uniformly distributes a vacuum to secure the green sheet to the printer's stage plate.
- Printing is typically performed using a 325 mesh, stainless steel screen with a 10 to 12 micron emulsion thickness.
- Printing should be performed in a clean, well ventilated area. Optimum printing characteristics are generally achieved when the room and paste container temperatures are in the 20 to 23°C range.

• Clean-up solvent

- 1-Propoxy-2-Propanol

• Drying

- Allow conductor prints to level for 5 to 10 minutes at room temperature and then dry in a well ventilated oven or conveyor dryer for 5 minutes at 100°C. Do not over-dry.

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• Lamination

- Collate, stack and laminate multiple sheets of the printed circuit patterns according to the recommended processing parameters detailed in the Micromax™ GreenTape™ 9K7 LTCC 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.
- 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™ LL612 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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