

Micromax™ 8070

Electronic Inks and Pastes

Resistor Compositions

Resistor compositions Micromax™ 8070 and 8074 are intended to be applied to ceramic substrates by screen printing and fired in a conveyor furnace in an air (oxidising) atmosphere, to form specific resistive elements in hybrid microcircuits and networks. These resistors provide an extension to the Micromax™ HS80 Series, extending the resistance range up to 40MΩ/sq.

Product characteristics

- Resistances up to 40MΩ/sq
- Blendable with Micromax™ HS80 (Micromax™ 8059)
- Compatible with Pd/Ag conductors
- Laser trimmable

Product information

Solvent or thinner	Micromax™ 8250
Blend member or series	8070 and 8074

Rheological properties

Viscosity	145 - 210 ^[1] Pa.s
-----------	-------------------------------

[1]: Brookfield HBT, UC&SP, SC4-14/6R, 10 rpm, 25°C ± 0.2°C

Application technique

Mask mesh	200
Mask emulsion	8 - 12 μm
Drying time	10 - 15 min
Drying temperature	150 °C
Theoretical coverage	80 - 110 ^[2] cm ² /g

[2]: based on wet film thickness of 50μm

Electrical properties

Surface resistivity	9E9 - 1.1E10 ^[3] mOhm per square
Hot Temperature Coefficient Resistance	-250 - 250 ^[4] ppm/K
Cold Temperature Coefficient Resistance	-250 - 250 ^[5] ppm/K

[3]: sheet resistance values are reported to 25μm dried thickness

[4]: measured in the ranges : +25°C to +125°C

[5]: measured in the ranges : -55°C to +25°C

Micromax™ 8070

Electronic Inks and Pastes

Storage and stability

Shelf life

6^[6] months

[6]: in unopened containers, from date of shipment, at temperature <25 °C (>0 °C)

Additional information

How to use

Design & compatibility

• Design

- Micromax™ 8070 and 8074 compositions are NOT recommended for high voltage applications. Parts should be protected from static charges. Micromax™ 8070 and 8074 compositions are blendable together. Micromax™ 8070 is blendable with Micromax™ 8059 (1MΩ/sq).
- Variations in the peak firing temperature or insufficient airflows may result in shifts in of resistivity or TCR.
- In general glass encapsulation is not required. However, in applications which require mechanical protection from extreme environments, low temperature encapsulants Micromax™ QQ550 or 9537 are recommended to be screen printed over the resistors before laser trimming and fired at 500 °C.
- To ensure long term stability of the resistors and to achieve maximum trimming accuracy, care is needed in the choice trimming parameters and trim geometry. Parameters should be selected to achieve a clean laser cut (Kerf) and it is recommended to cut into the substrate by 6-8µm. Measurement of high ohmic resistors also require different techniques and is invariably much slower than for normal resistance values.

• Compatibility

- Whilst Micromax™ 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 materials in their specific situations in order to completely satisfy themselves with the overall quality and suitability of the compositions for their intended application(s).

Processing

• Substrates

- 96% alumina.
- Substrates of different compositions and from various manufacturers may result in variations in performance properties.

Micromax™ 8070

Electronic Inks and Pastes

• Printing

- 200 mesh stainless steel screen with a 8-12µm emulsion thickness. Print speeds of 10 to 20 cm/s may be used.
- 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.
- Class 10,000 printing area is recommended for building complex hybrids and multilayer circuits, otherwise severe yield losses could occur.

• Thinning

- This composition is optimized for screen printing, thinning is not normally required.
- Use the Micromax™ 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 behaviour of the material and its printing characteristics.

• Drying

- 10-15 minutes at 150°C.
- Allow prints to level for 5-10 minutes at room temperature, then dry in a well ventilated oven or conveyor dryer.

• Firing

- 850°C peak held for 10 minutes on 60 minute cycle in an air (oxidising) atmosphere.
- Fire in a well ventilated belt or conveyor 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.

Properties

• Notes

- Specified properties are based on resistors printed to 25±3µm dried print thickness.
- Typical fired properties are based on laboratory tests (see resistor method G-1.5.5).
- Unless expressly noted elsewhere the following processing conditions have been used:

Micromax™ 8070

Electronic Inks and Pastes

- Pd/Ag conductor composition 9061 terminations prefired at 850 °C. Substrate 96% Alumina Dried Print with thickness of 25±3µm. Fired on a 60 minute firing cycle with ten minutes at peak of 850 °C. Resistor geometry 1.5mm x 1.5mm.
- All values reported here are results of experiments in our laboratories intended to illustrate product performance potential with a given experimental design. They are not intended to represent the product's specifications, details of which are available upon demand.

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 matter may also contribute to poor yields.

Storage and shelf life

Storage : Containers may be stored in a clean, stable environment at room temperature (< 25 °C), with their lids tightly sealed. Storage in freezers (temperature < 0 °C) is NOT recommended as this could cause irreversible changes in the material.

Shelf life : This composition has a shelf life of 6 months from date of shipment for factory-sealed (unopened) containers, stored under room-temperature conditions.

Safety and handling

For safety and handling information pertaining to this product, read Safety Data Sheet (SDS).