

Micromax™ 4195

Microcircuit and Component Materials

High Temperature Glass Encapsulant

High temperature glass encapsulant composition Micromax™ 4195 is intended to form an insulating and protective layer over thick film circuits and especially over thick film silver bearing conductors. It is applied to ceramic substrates by screen printing and fired in a conveyor furnace in an air (oxidizing) atmosphere.

Product benefits

- Protection against silver migration of adjacent silver bearing conductor lines and solder barrier
- Protection against environmental conditions, and mechanical abrasion
- Protection against reactive chemicals and potting compounds
- Blue fired film
- Fired at a peak temperature of 850 °C

Rheological properties

Viscosity 170 - 230^[1] Pa.s
 [1]: Brookfield HBF, #5, 10 rpm, 25 °C ± 0.1 °C

Application technique

Mask mesh	200 - 250
Mask emulsion	10 - 12 μm
Drying time	10 - 15 min
Drying temperature	150 °C
Theoretical coverage	80 - 90 ^[2] cm ² /g
Recommended film thickness, fired	18 - 20 μm
Leveling time	5 - 10 min

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

Storage and stability

Shelf life 6^[3] months
 [3]: in unopened containers, from date of shipment, at temperature <25 °C (>0 °C)

Additional information

How to use

Design & compatibility

• Design

- Properties are based on tests on 96% alumina substrates. Micromax™ 4195 encapsulant composition can be used with Micromax™ silver bearing conductors such as Micromax™ 7484R, and 6160. Glass encapsulant Micromax™ 4195 is not usually suggested as a resistor encapsulant. This encapsulant is

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not suitable for laser trimming. It should also be noted that refiring of thick film resistors at high temperature will change the resistance values, so allowances should be made for this in the processing and design of a circuit.

- **Compatibility**

- While 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**

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

- **Printing**

- The use of a double wet pass print mode should help to minimize pinholes in the film, 200 or 250 mesh stainless steel screen with 45° bias and 10-12µm emulsion thickness. Print speed of 2.5-10 cm/sec.
- The composition should be thoroughly mixed before use. This is best achieved by slow, gentle, 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 behavior of the material and its printing characteristics.

- **Drying**

- 10-15 minutes at 150°C.

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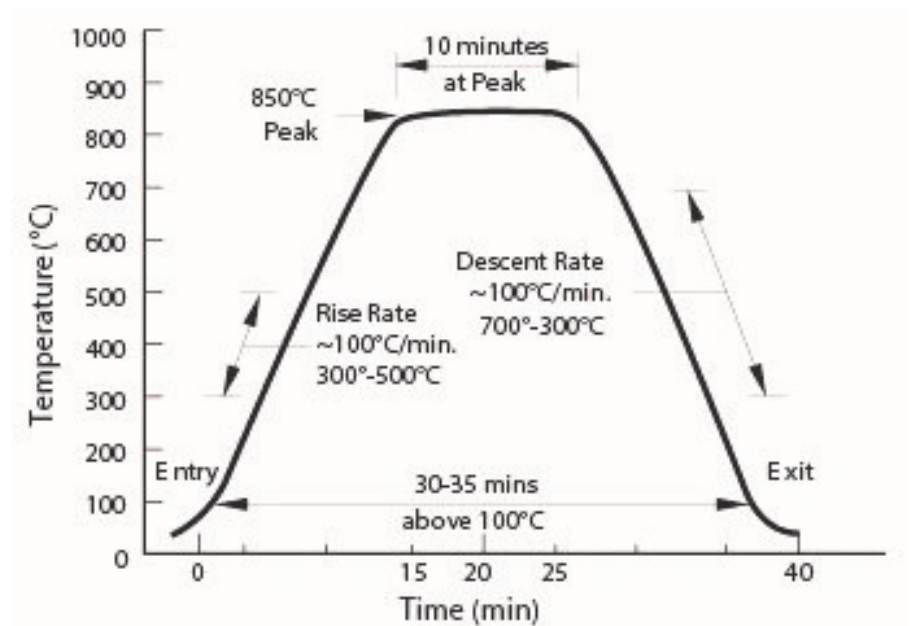
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- Allow prints to level for 5-10 minutes at room temperature, then dry in a well ventilated oven or conveyor dryer.

• Firing

- 850°C peak held for 10 minutes on 30/60 minute cycle in an air 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.

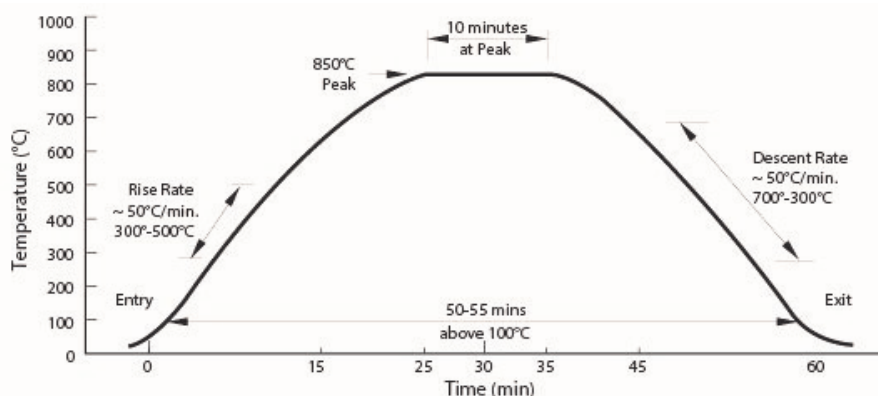
Typical 30 Minute Profile



Typical 60 Minute Profile

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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 ($< 25^{\circ}\text{C}$), with their lids tightly sealed. Storage in freezers (temperature $< 0^{\circ}\text{C}$) 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).