Micromax™ 5081R

Electronic Inks and Pastes

Silver Brazing Low Temperature Braze System

Micromax™ 5081R and 5082R constitute a two component, all thick films paste system designed to facilitate the use of high temperature solders and low temperature alloys on :
• 96% alumina and Low temperature cofire ceramic (Micromax™ GreenTape™ 951 low temperature co-fired ceramic system).
• Alumina
• Multilayer hybrid circuits

Product benefits

• High strength, high reliability attachment mechanism
• Hermetic packaging
• Compatibility with thick film resistors, as well as all conventional IC and lid attach processes
• Phthalate and Cadmium free*

* Phthalate and Cadmium oxide 'free' as used herein means that cadmium 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™ 7502R
Blend member or series	5081R and 5082R

Rheological properties

Viscosity	60 - 120[1]	Pa.s

[1]: Brookfield HBT, UC&SP, SC4-14/6R, 50 rpm, 25 °C ± 0.2 °C

Application technique

Mask mesh	325	
Mask emulsion	13	µm
Drying time	10 - 15	min
Drying temperature	150	°C
Recommended film thickness, fired	12 - 15	µm
Leveling time	≥10	min

Electrical properties

Surface resistivity	3.5 - 5[2]	mOhm per square

[2]: at 10µm fired thickness

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Storage and stability

Shelf life	6[3] months

[3]: in unopened containers, from date of shipment, at temperature between 5-30 °C

Additional information

How to use

Design & compatibility

- 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 material in their specific situations in order to completely satisfy themselves with the overall quality and suitability of the composition for its intended application (s).

Processing

- Substrates
  - Substrates of different compositions and from various manufacturers may result in variations in performance properties.
- Screen types
  - Print onto fired substrate using a 325 mesh stainless steel screen with a 13µm emulsion build up.
- Printing
  - 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 about 1-2 minutes. Care must be taken to avoid air entrapment. Printing should be performed in a 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 the 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
  - Micromax™ 5081R and 5082R compositions are optimized for screen printing and 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

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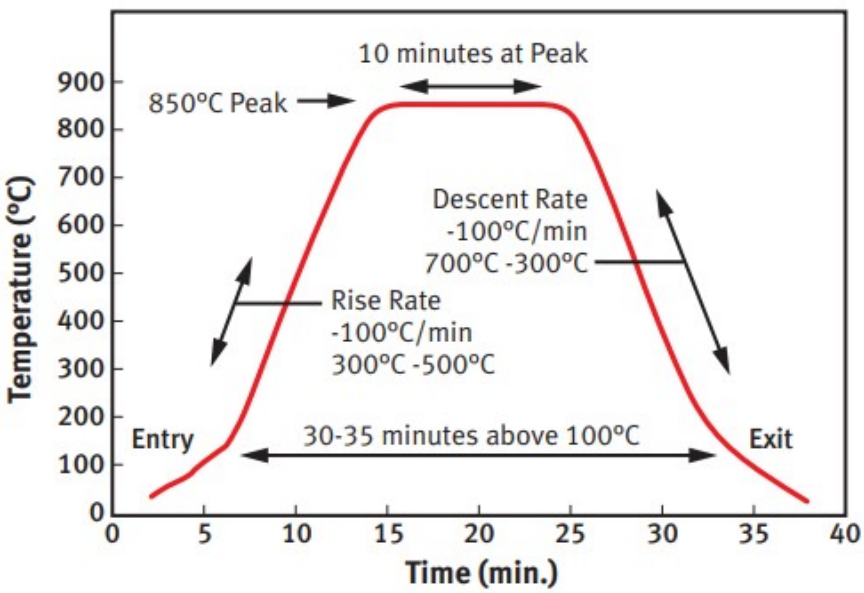
rheological behaviour of the materials and their printing characteristics.

- Drying
  - Allow prints to level for over 10 minutes at room temperature, then dry for ≥ 10-5 minutes at 150°C.
  - Dry in a well ventilated oven or conveyor dryer.
- Firing
  - 850°C peak held for 10 minutes on 30 minute cycle in an air atmosphere. Fired thickness of Micromax™ 5081R should be 12-15µm.
  - Fire in well ventilated belt, conveyor furnace 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.
- Attachement
  - Once the substrate has been prepared with Micromax™ 5081R and 5082R, pins, window frames or heat sinks may be attached with braze alloys (Au/Sn), preforms or pastes. Brazing is performed in nitrogen atmosphere using fixed fixtures which position the attachment and braze alloy directly on top of the Micromax™ 5081R/5082R metallization.

FIGURE 1. 30 MINUTES PROFILE



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Properties

Typical Fired Properties*1

Test	Properties
PGA Reliability Thermal Cycle*2 (lbs)	≥ 15
PGA Reliability Thermal Aging*3 (lbs)	≥ 15
Seal Ring Reliability*4 (Atm cm^3/s)	$< 10^{-8}$

*1 Average tensile pull strength of a pin in a standard grind array (PGA) brazed on 96% alumina or Micromax™ 951 GreenTape™. PGA consist of 1.8mm diameter pad of Micromax™ 5081R/5082R, and a 400µm diameter Kovar pin with a 800µm diameter nail head. 80Au/20Sn braze preform.
Firing : 30 minute cycles to a peak temperature of 850°C for 10 minutes.
*2 200 cycles, -40°C to 125°C, Rapid transfer
*3 200 hrs in air at 150°C
*4 Helium leak test to Kovar seal ring on Micromax™ 951 GreenTape™, 100 thermal cycles, -25°C to +85°C

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

Containers may be stored in a clean, stable environment at room temperature (between 5°C – 30°C) with their lids tightly sealed. Storage in high temperature (>30°C) or in freezers (temperature <0° C) is NOT recommended as this could cause irreversible changes in the material. The shelf life of compositions in factory-sealed (unopened) containers between (5°C – 30°C) is 6 months from date of shipment.

Safety and handling

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

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Revised: 2023-06-26 Source: Celanese Materials Database