Micromax™ 5744R

Microcircuit and Component Materials

Gold Conductor Composition

Micromax™ 5744R is a cadmium free* gold conductor. It has been specifically developed for automatic wire bonding with both Al and Au wires. Micromax™ 5744R is used for bonding pads on alumina and on Micromax™ 5704 dielectric , and as such, can be employed in single layer and crossover Pd/Ag circuits as well as in simple multilayer circuits using silver bearing conductors.

Product benefits

- Cadmium free* gold conductor and Phthalate free*
- Wide bonding window
- Suitable for manual and automatic gold and aluminum wire bonding
- High wire pull strengths after storage at 150°C for 1,000 hours using Au and Al wires

*Cadmium and Phthalate '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™ 9450

Rheological properties

Viscosity	280 - 350[1]	Pa.s

[1]: Brookfield HBT,20rpm, SC4- 14/6R utility cup and spindle,25°C±0.2°C

Application technique

Mask mesh	325	
Mask emulsion	12	µm
Drying time	10 - 15	min
Drying temperature	150	°C
Theoretical coverage	60 - 65	cm^2/g
Recommended film thickness, fired	7 - 9	µm
Print resolution, lines	≤175	µm
Print resolution, spaces	≥175	µm
Leveling time	5 - 10	min

Electrical properties

Surface resistivity	≤6.5[2]	mOhm per square

[2]: @ 8µm fired thickness

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Storage and stability

Shelf life	6[3] months

[3]: in unopened containers, from date of shipment, at room temperature (between 5 °C – 30 °C)

Additional information

How to use

Design & compatibility

- Design notes
  - Properties are based on tests on 96% alumina substrates. In crossover and simple multilayer circuits using silver bearing conductors, Micromax™ 5744R is compatible with many materials, however, when mixing conductor of different metallurgy (including Pd-Ag and Ag with Au), caution should be exercised. Consult with your Micromax™ representative for recommendations on design and processing.
- 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
  - 325 stainless steel screen with a 12µm 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,

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otherwise severe yield losses could occur.

- Thinning
  - Micromax™ 5744R composition is 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 rheological behaviour of the material and its printing characteristics.
- Drying
  - Allow prints to level at room temperature, and then dried.
- Firing
  - 850 °C peak held for 10 minutes on 30-60 minute cycle in an air atmosphere.
  - 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.

Properties

Typical Fired Properties*1

Test	Properties
Line Resolution	≤ 175µm lines ≥ 175µm spaces
Ultrasonic Aluminum Wire Bonding 38µm wire*2 (g) Initial pull strength	≥ 17
Thermosonic Gold Wire Bonding 32µm wire*2 (g) Initial pull strength	≥ 17

*1 Typical properties are based on laboratory data using recommended processing procedures.
*2 All wire breaks. No bond lifts, on alumina and on Micromax™ 5704
Bonding conditions:
Bonded using Al manual bonder, 38µm Al wire (1% silicon)
Bonded using Au automatic wire bonder, 32µm Au AW7 wire

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.

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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

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).

Revised: 2023-03-08 Source: Celanese Materials Database

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colourants or other additives may cause significant variations in data values. Properties of moulded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design, processing conditions and environmental exposure. Other than those products expressly identified as medical grade (including by MT® product designation or otherwise), Celanese's products are not intended for use in medical or dental implants. Regardless of any such product designation, any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. The information contained in this publication should not be construed as a promise or guarantee of specific properties of our products. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that exist. We recommend that persons intending to rely on any recommendation or to use any equipment, processing technique or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards. We strongly recommend that users seek and adhere to the manufacturer's current instructions for handling each material they use, and entrust the handling of such material to adequately trained personnel only. Please call the telephone numbers listed for additional technical information. Call Customer Services for the appropriate Materials Safety Data Sheets (MSDS) before attempting to process our products.
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