KOARTAN
MICROELECTRONIC INTERCONNECT MATERIALS
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REV. 120712

Technical Information

4000 and 4500 Pure Gold Conductor Pastes

The thick film composition 4000 is a 100% gold paste, without any glasses, oxides, or other inorganic compounds. Its primary application is in repairing hybrid circuits. A high-solids version of this paste, 4500, is available for plugging pre-coated holes in substrates. Pre-coating of alumina substrate with KOARTAN 4530 or similar paste is recommended. Near hermetic plugs can be obtained this way for small holes. Key features include:

- RoHS Compliant
- High Electrical Conductivity
- High Thermal Conductivity
- High Solids

TYPICAL FIRED FILM CHARACTERISTICS(1)

Fired Thickness	8-11 µm
Line Resolution	175/125 µm line/space using 150/150 µm pattern and 325 mesh screen
Resistivity(2) Milliohms/square at 10 µm fired thickness	≤ 4

(1) Typical properties are based on testing of several batches under various processing conditions. They are not intended as specification limits.
(2) Measured on 0.020" wide tracks

COMPOSITION PROPERTIES

Viscosity: measured with Brookfield HBT viscometer, Spindle #14, utility cup, 10 RPM, 25℃:

	4000	4500
Viscosity:	180-220 KcpS	500-1000 Kcps
Solids Content:	84.0 -880.0 %	94.0 – 97.0%

Recommended Thinner: KOARTAN B-1194

RECOMMENDED PROCESSING PROCEDURE

Printing: Printing of the 4000 paste with 325 mesh stainless steel screen using 10-15 µm emulsion and 45 degree angle is recommended. Other mesh counts, 230-280, and emulsion thicknesses, 5-25 µm, may be used for special applications. Squeegee speeds of up to 6 inches/sec may be utilized.

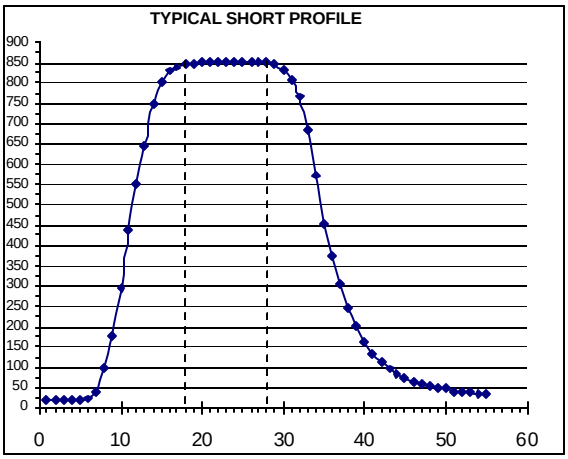
Coverage is approximately 60 cm^2/g when utilizing 325 mesh screen and a wet print thickness of about 35 µm.

For hole filling with the 4500, using a bladder machine or 3-5 mil thick stencil is recommended. Pulling vacuum through a porous stone aids in obtaining good plugs if the stencil method is used. Placing an absorbent paper under the substrate also helps in draining the excess liquid and results in a denser mass, regardless of the filling method.

Drying: Wet prints should be allowed to level for 5-10 minutes prior to drying. Dry for 10-15 minutes in a convection oven or belt dryer at 125℃-150℃. Plugged substrates should be dried for 30 minutes to ensure complete drying inside the holes.

Firing: Firing in air using a belt furnace and a 36-60 minute profile, with 10 minutes at a peak temperature of 850℃ is recommended. Air flow rates must be optimized to ensure that the products of binder burn-off discharge properly and create a fully oxidizing atmosphere in the muffle.

Application Notes: If not handled properly, thick film gold conductors are prone to blistering. Circuits should be handled using gloves to avoid oily contamination from the fingertips. The rate of temperature rise during firing should not exceed 130°C /minute.



Temperature (℃) vs. Time (minutes)

Storage and Shelf Life: Store in tightly capped containers at room temperature. Shelf life is 6 months for unopened jars. Under ordinary conditions of storage and use the product should not require thinning. However, solvent loss during extended printing runs may be corrected by incorporating up to 0.5% of Koartan B-1194 thinner.