KOARTAN

MICROELECTRONIC INTERCONNECT MATERIALS

Mountain Ridge Business Park, Unit B12
1248 Sussex Turnpike, Randolph, New Jersey 07869-2908
Phone: 973.895-3600 Fax: 973.895-3617 www.koartan.com
Distributed in the UK, Ireland & Scandinavia by: Inseto, Tel: +44 (0)1264 334505 www.inseto.co.uk

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Technical Information

5350 Series Capacitor Dielectric System

The 5350 capacitor dielectric system consists of four blendable members. This barium titanate based system is suitable for the integration of capacitors in thick film microcircuits, as well as for the manufacture of discrete components. The thermal expansion of these materials is well matched to that of 96% alumina, resulting in a dense film. Capacitors may be buried under or within layers of multilayer systems. Key features of the system include:

- Blendability Across the Full Range.
- Firing in Standard 850°C Profile.
- Compatibility with 100% Ag, Ag:Pd, and Gold Electrodes.
- Tight TCC: X7R
- Laser Trimmable with Ag:Pd Electrode.
- Passivation with High or Low Temperature Overglaze.

TYPICAL FIRED FILM CHARACTERISTICS(1)

	5350	5351	5352	5355
Dielectric Constant(2)	50 ± 15%	100 ± 15%	250± 15%	500± 15%
Dissipation Factor @ 1KHz, 25°C	≤ 1.0 %	≤ 1.2 %	≤ 1.5 %	≤ 2.0 %
Insulation Resistance (IR) Ohms @ 100VDC	≥ 10^{12}	≥ 10^{12}	≥ 10^{12}	≥ 10^{12}
Fired Thickness Microns	34-45	34-45	34-45	34-45
Dielectric Strength VDC @ recommended thickness	≥ 600	≥ 600	≥ 600	≥ 600
Temperature Characteristic	X7R(3)	X7R(3)	X7R(3)	X7R(3)

(1) Typical properties are based on testing of several scale up batches under various processing conditions. They are not intended as specification limits.
(2) The electrical results are based on 0.100" x 0.100" capacitors fabricated with 5350 series dielectrics and 6111 silver pastes. Three layers of dielectric were utilized to achieve the recommended fired film thickness.
(3) The X7R designation means a maximum capacitance (dielectric constant) shift of ± 15% from -55°C to +125°C

COMPOSITION PROPERTIES

Viscosity: 170 ± 30 Kcps, when measured with Brookfield HBT, Spindle #14, utility cup, 10 rpm, 25 C.

Specific Gravity: 3.0 -3.5 g/cm^3

Recommended Thinner: KOARTAN A-1039

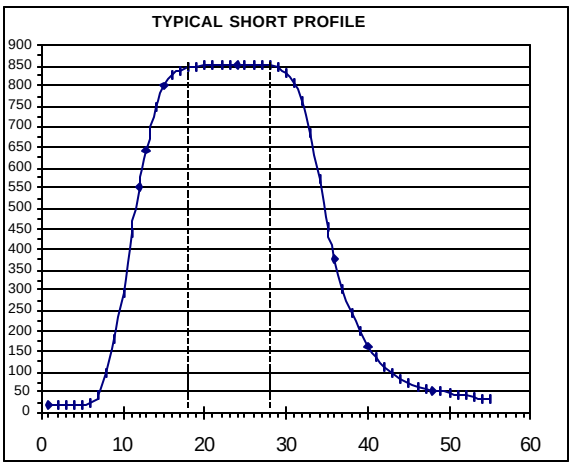
RECOMMENDED PROCESSING PROCEDURE

Printing: For best results, three separate print/dry/fire operations with 325 mesh stainless steel screen using 10-15 ìm emulsion and 45 degree angle is recommended. Each printing operation should consist of two wet passes. Other mesh counts, 200-250, and emulsion thicknesses, 5-25 ìm, may be used for special applications. A class 10,000 or better clean room should be utilized if only two layers of dielectric are printed. Depending on the print area, squeegee speeds of up to 10 inches/sec may be utilized.

Coverage is approximately 70 cm^2 per layer, when utilizing 325 mesh screen and a wet print thickness of about 35 ìm.

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°C-150°C.

Firing: Firing in air using a belt furnace and a 36-60 minute profile, with 10 minutes at a peak temperature of 850°C, 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.



Passivation: Two layers of a hermetic overglaze are recommended. The overglaze must overlap the capacitor by at least .010" all around. Please consult Koartan's technical staff for recommendation for your particular application.

Storage and Shelf Life: Store in tightly capped containers at room temperature. Shelf life is 6 months for unopened jars. Thorough mixing of the paste before each use is recommended. 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 A-1039 thinner.