

Technical Information

5866 Low Temperature Cross-Over Dielectric

The 5866 dielectric composition was developed for applications on aluminum oxide, requiring low firing temperatures. It fires to a dense film in a standard 600°C, 30-45 minute profile. The 5866 dielectric is a crystallizing composition, thus allowing conductor soldering and component

attachment on top of it. Key features include:

- RoHS Compliant
- Thermal Expansion Match to Alumina
- Excellent Via Resolution
- Dense, Crystallizing Composition
- Low Firing Temperature

TYPICAL FIRED FILM CHARACTERISTICS⁽¹⁾

Color	Blue
Fired Thickness	40 - 50 μ m
Via Resolution⁽²⁾	250 μ m (0.010")
Dielectric Constant⁽³⁾	8-12
Dissipation Factor @ 1KHz	\leq .5%
Insulation Resistance (IR) Ohms @ 100VDC	$\geq 10^{12}$
Dielectric Strength VDC	≥ 600

(1) Typical properties are based on testing of several batches under various processing conditions. They are not intended as specification limits.

(2) Using 325 mesh screen

(3) The electrical results are based on 0.350" x 0.600" capacitors fabricated with 5866 dielectric and 6166 silver pastes. Three layers of dielectric were utilized to achieve the recommended fired film thickness.

COMPOSITION PROPERTIES

Viscosity: 250 \pm 30 Kcps, when measured with Brookfield HBT viscometer, Spindle #14, utility cup, 10 RPM, 25°C

Specific Gravity: 1.80 – 2.20 g/cm³

Recommended Thinner: KOARTAN A-1039

RECOMMENDED PROCESSING PROCEDURE

Printing: For best results, three to four separate print/dry/fire operations with 325 mesh stainless steel screen using 10-15 μm emulsion and 45 degree angle is recommended. Other mesh counts, 200-325, and emulsion thicknesses, 5-25 μm , may be used for special applications. Clean room environment is recommended if only three layers are used.

To ensure excellent via resolution and good leveling, the 5866 possesses a special rheology. Use a screen with good tension and allow the proper break away to avoid screen popping. Depending on the print area, squeegee speeds of up to 6 inches/sec may be utilized.

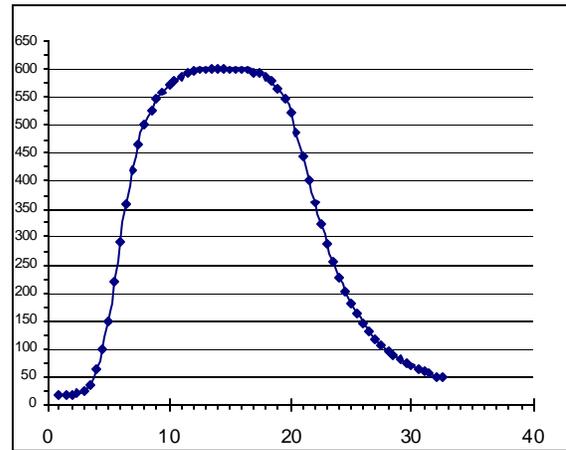
Coverage is approximately 120 cm^2/g per layer, when utilizing 325 mesh screen and a wet print thickness of about 35 μm .

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 30-45 minute profile, with 10 minutes at a peak temperature of 600°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.

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 lost during extended printing runs may be replaced by incorporating up to 0.5% of Koartan A-1039 thinner.



Temperature (°C) vs. Time (minutes)

Application Notes: The 5866 was designed to fire in the temperature range of 580°C-650°C. Firing at temperatures in excess of 650°C must be avoided, as this may cause dielectric blistering.

The 5866 may be used with silver or gold conductors. Mixing gold and silver on the same circuit is not recommended. Silver bearing circuits must be glazed for protection from moisture. The recommended conductors are 600°C firing Silver 6166 or gold 4906. The 500°C firing silver 6165 or gold 4505 may be used on top once the dielectric has been fired at 600°C. The Pb-free overglaze 5651 is recommended for passivation.

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