

## Technical Information

# 6111 Silver Conductor

The thick film silver composition 6111 is a general purpose conductor. Its high electrical conductivity and good line resolution make it particularly suitable for high density microcircuit applications. It is also a good termination for thick film capacitors and resistors. It does not contain

cadmium, nickel, or highly toxic organic solvents. Key features include:

- High Conductivity
- Good Line Resolution
- High Speed Printing
- Compatibility with Dielectrics and Resistors.

### TYPICAL FIRED FILM CHARACTERISTICS<sup>(1)</sup>

<b>Fired Thickness</b>	12-16 $\mu$ m
<b>Line Resolution</b>	175/125 $\mu$ m line/space using 150/150 $\mu$ m pattern and 325 mesh screen
<b>Resistivity</b>	$\leq$ 2.50 m $\Omega$ / at 12 $\mu$ m fired thickness
<b>Solder Acceptance<sup>(2)</sup></b> 36/62/2 Sn/Pb/Ag, on 96% alumina	Excellent
<b>Solder Leach Resistance<sup>(3)</sup></b>	2-3 Cycles
<b>Adhesion<sup>(4)</sup></b>	
Initial	> 22 N
500 Hours @ 150° C	> 18 N

- (1) Typical properties are based on testing of several scale up batches under various processing conditions. They are not intended as specification limits.
- (2) Excellent refers to nearly 100% coverage of both pads and lines after a 5-second dip in the solder bath at 225 +/-5 C, using Alpha 611 mildly activated flux.
- (3) Cycles consist of 10-second dips in a 225 +/-5 C solder bath. Each cycle is preceded by dipping in Alpha 611 flux.
- (4) The adhesion test consists of attaching 20 AWG tinned copper wire to .080"x.080" pads, by dipping in 225 +/-5 C solder for 5 seconds. The wires are then bent 90 degrees and pulled, while a force gauge records the peel strength.

## COMPOSITION PROPERTIES

**Viscosity:** 90-130 Kcps, when measured with Brookfield HBT, Spindle #14, utility cup, 10 rpm, 25 C.

**Specific Gravity:** 4.0-4.5 g/cm<sup>3</sup>

**Recommended Thinner:** KOARTAN A-1039

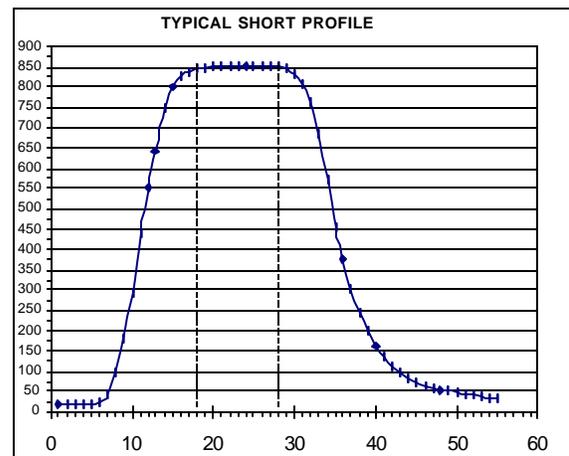
## RECOMMENDED PROCESSING PROCEDURE

**Printing:** Printing with 325 mesh stainless steel screen using 10-15  $\mu$ m emulsion and 45 degree angle is recommended. Other mesh counts, 200-250, and emulsion thicknesses, 5-25  $\mu$ m, may be used for special applications. Squeegee speeds of up to 10 inches/sec may be utilized.

Coverage is approximately 60 cm<sup>2</sup>, when utilizing 325 mesh screen and a wet print thickness of about 35  $\mu$ m.

**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.



**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 replaced by incorporating up to 0.5% of Koartan A-1039 thinner.

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