

Technical Information

6165 Low Temperature Silver Conductor

The thick film silver composition 6165 is designed for applications requiring low processing temperature and high electrical conductivity. It provides a dense and solderable film when fired at 500°C. The 6165 is intended primarily for dielectric coated substrates, but it adheres to a variety of substrates, including 96% alumina. On certain glassy surfaces it provides a dense

film upon firing at 400°C. 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⁽¹⁾

Firing Temperature	500°C
Fired Thickness	12-16 μm
Line Resolution	175/125 μm line/space using 150/150 μm pattern and 325 mesh screen
Resistivity	≤ 3.0 milliohms / sq at 12 μm fired thickness
Solder Acceptance⁽²⁾ 36/62/2 Sn/Pb/Ag, on 96% alumina	Excellent
Solder Leach Resistance⁽³⁾	1-2 Cycles
Adhesion⁽⁴⁾	> 22 N

(1) Typical properties are based on testing of several 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 at constant speed, while a force gauge records the peel strength.

COMPOSITION PROPERTIES

Viscosity: 120-180 Kcps, when measured with Brookfield HBT, Spindle #14, utility cup, 10 RPM, 25°C.

Specific Gravity: 3.6 – 4.0 g/cm³

Recommended Thinner: KOARTAN A-1039

RECOMMENDED PROCESSING PROCEDURE

Printing: Printing with 280 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. Squeegee speeds of up to 10 inches/sec may be utilized.

Coverage is approximately 60-80 cm², when utilizing 280 mesh screen and a wet print thickness of about 36-40 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 28-60 minute profile, with 10 minutes at a peak temperature of 500°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.

On certain surfaces, such as glassy dielectrics and oxidized silicon wafers, the 6165 provides a fairly dense film upon firing to 400°C for 20-30 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 replaced by incorporating up to 0.5% of Koartan A-1039 thinner.

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