

## Technical Information

# 7900 SERIES Ag:Pd RESISTOR PASTES

## BLENDABLE LEAD-FREE COMPOSITIONS

The 7900 series compositions were developed primarily for the fabrication of high power chip and network resistors. However, they can also be utilized for high voltage surge protection circuitry in telecommunication applications, as well as for AC heating elements. They do not contain cadmium, lead, nickel, or highly toxic organic solvents. Key features of the system include:

- RoHS Compliant
- Wide Resistivity Range
- Tight TCR
- Blendability Across the Full Range
- Firing in Standard 850°C Profile
- Compatibility with BeO and Low-Pd Termination.
- Passivation with Low and High Temperature Overglaze.

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

	<b>7900-5</b>	<b>7900</b>	<b>7910</b>	<b>7911</b>
<b>Resistivity</b> <sup>(2)</sup> Ohms/Square	0.050 ± 20%	0.100 ± 20%	1 ± 20%	10 ± 20%
<b>TCR</b> <sup>(3)</sup> ppm/°C, - 55°C to +125°C	± 100	± 100	± 100	± 100

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

(2) The resistivity is measured on 1mmx1mm pads, fabricated with 7900 series resistors and 6229 palladium- silver termination. All firing done in a standard 36 minute furnace profile with 10 minutes at 850°C.

(3) To minimize the effect of connecting wires on TCR, the TCR is measured on sufficiently long resistors to provide a resistance of at least one ohm, i.e. at least 20 squares for 7900-5, 10 squares for 7900.

### COMPOSITION PROPERTIES

**Viscosity:** 160-220 Kcps, when measured with Brookfield HBT viscometer, Spindle #14, utility cup, 10 RPM, 25°C

**Recommended Thinner:** KOARTAN A-1039

## RECOMMENDED PROCESSING PROCEDURE

**Printing:** For best results, printing with a 280 mesh stainless steel screen with 10-15  $\mu\text{m}$  emulsion and 45 degree angle is recommended. Other mesh counts, 200-325, and emulsion thicknesses, 5-25  $\mu\text{m}$ , may be used for special applications.

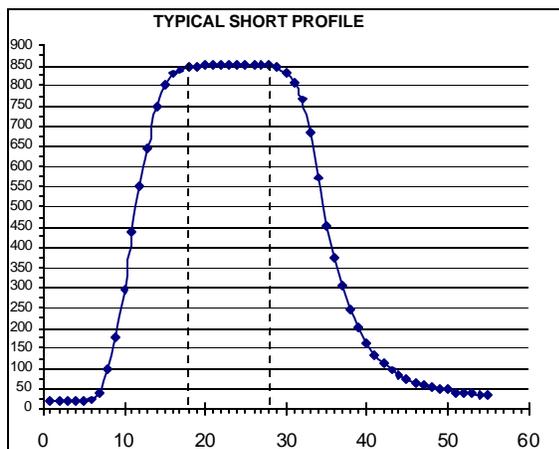
Coverage varies significantly among the end members, as the solids content is different.

**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.

**Application Notes:** The 7900 series resistors are suspensions of metallic particles. At or below one ohm/square, metal-metal contacts in the fired film are abundant. These materials are fairly insensitive to firing conditions and resistor geometry. Above one ohm/square, however, the number of metal-metal contacts is significantly decreased. As a result, the 7911 is sensitive to firing temperature, furnace atmosphere, type of heater (IR vs conventional), and resistor size. The 7911 is seldom used by itself; it is predominantly utilized as a blend member.

**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.



*Temperature (°C) vs. Time (minutes)*

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