



**MICROELECTRONIC INTERCONNECT MATERIALS**

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## Technical Information

# 7961 SERIES Pd-Ag RESISTOR PASTES

## BLENDABLE Pb-FREE COMPOSITIONS FOR ALUMINUM NITRIDE

The 7961 series compositions were developed primarily for the fabrication of telecommunication circuitry on aluminum nitride substrate. They exhibit tight TCR and excellent power handling capability. A lower cost version of this series, 7981 series, with a looser TCR specification, is available for heaters and other applications where tight TCR is not required. Key features of the system include:

? Wide Resistivity Range

- ? Tight TCR
- ? Lead-Free Compositions
- ? Blendability Across the Full Range.
- ? Firing in Standard 850°C Profile.
- ? Compatibility Aluminum Nitride
- ? Passivation with Low and High Temperature Overglaze.

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

	<b>7961</b>	<b>7965</b>	<b>7971</b>	<b>7973</b>
<b>Resistivity</b> <sup>(2)</sup> Ohms / Square	0.100 ± 20%	0.500 ± 20%	1.000 ± 20%	3.000 ± 20%
<b>TCR</b> ppm/°C, 25°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 1mmx14mm pads, fabricated with 7961 series resistors and 6292 palladium- silver termination, on 0.040" thick AlN substrate supplied by Maruwa America Corporation. All firing done in a standard 36 minute furnace profile with 10 minutes at 850°C.

### COMPOSITION PROPERTIES

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

**Recommended Thinner:** KOARTAN A-1039

## RECOMMENDED PROCESSING PROCEDURE

**Printing:** For best results, printing with a 250 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.

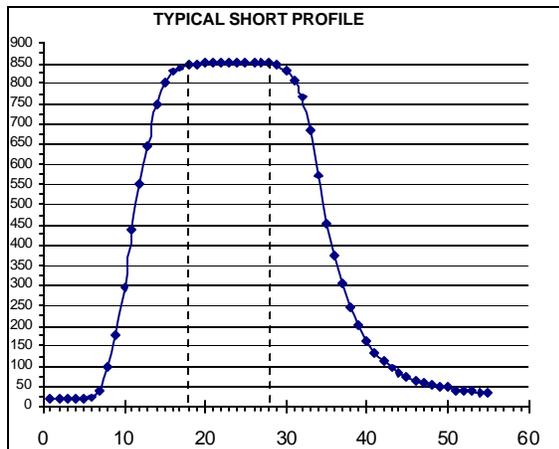
Coverage varies significantly among the end members, as the paste specific gravity is different.

**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 7961 series resistor pastes have high palladium contents. During heating and cooling palladium metal oxidizes in the 500°C-700°C temperature range; it converts back to metallic form when it gets out of this range. However, if Pd-Ag resistors are overglazed in this temperature range, the overglaze prevents the palladium from fully converting back to metallic. As a result, an upward resistance shift of up to 30% may result when the overglaze firing temperature is 600°C-650°C. KOARTAN overglaze 5660 paste fires in this temperature range and limits the resistance shift to  $\pm 1\%$ .

**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.



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