

## Preliminary Technical Information

# 5643W Sealing Glass Paste

The 5643W was formulated for sealing of flat wafer level MEMS devices with narrow seal lines. It is suitable for silicon-silicon, silicon-alumina, and silicon-Kovar sealing. Thin layers of 5643W are recommended. For wider and/or thicker seals please refer to

Koartan 5645-SI data sheet. Key features include:

- RoHS Compliant
- Cadmium Free
- Nearly Hermetic
- Compatibility with Silicon and Other Low Expansion Substrates.

### TYPICAL FIRED FILM CHARACTERISTICS

<b>Paste Color</b>	White
<b>Firing Temperature</b>	425°C - 450°C, 10 -30 minutes
<b>Surface Finish</b>	Shinny
<b>Fired Film Color</b>	Gray

### COMPOSITION PROPERTIES

<b>Viscosity:</b>	130 ± 30 Kcps, when measured with Brookfield HBT viscometer, Spindle #14, utility cup, 10 rpm, 25°C
<b>Specific Gravity:</b>	2.0 - 2.6 g/cm <sup>3</sup>
<b>Recommended Thinner:</b>	KOARTAN A-1039

## RECOMMENDED PROCESSING PROCEDURE

**Printing:** Printing with 325 mesh stainless steel screen using 10-15 micron emulsion and 45 degree angle is recommended. Other mesh counts, 200-400, and emulsion thicknesses, 5-25 microns, may be used for special applications.

Coverage is approximately 120 cm<sup>2</sup>/g, when utilizing 325 mesh screen and a wet print thickness of about 34 microns.

**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:** For optimum results separate binder burn-out and sealing cycles are recommended.

The dried parts should first be fired to about 300°C and held for about 15 minutes before glazing at about 400°C. The ramp-up to binder burnout temperature should take 20-30 minutes. This can be done using a two-stage belt furnace or programmable box furnace. Dried air must be pumped into the furnace to assist in binder removal.

The parts are then mated together and fired at 425°C-450°C for 10-30 minutes, depending on device mass and furnace loading.

**Application Notes:** The coefficient of thermal expansion of 5643W is higher than that of silicon. However, due to low firing

temperature, sufficient thermal stress should not be generated during cooling to cause micro-cracking, particularly if the paste is printed thin and the seal area is narrow. It is important to conduct thermal cycling experiments on the finished circuit to insure long term reliability.

For larger seal areas or when thicker seals are desired, Koartan 5645-SI may be a better candidate for the application. The 5645-SI incorporates low expansion fillers, for better CTE match and stronger seal.

**Storage and Shelf Life:** Store in tightly capped containers at room temperature. Shelf life is 6 months for unopened jars. Settling of solids may occur if the paste is undisturbed for long periods. Thorough mixing of the paste before each use is recommended. A slower roller, if available, may be used to keep the solids in suspension.

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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