



TECHNICAL DATA SHEET

Z-904 UV CURABLE ANISOTROPIC CONDUCTIVE INK

Z-904 conducts electricity on the Z-axis direction through the thickness, and not along width or length of the printed ink

DESCRIPTION

- Ideal for screen printing over conductive ink tail pins on membrane switches to provide protection for the silver ink when ZIF or crimp type metal connectors are attached, while still maintaining electrical conductivity between the metal connector and the silver ink pin
- 100% solids, UV curable screen printable material that when printed or coated as a film layer will conduct electricity in the Z-axis direction (through its thickness) but not in the X or Y-Axis (along its width or length)
- Exhibits outstanding adhesion to print treated polyester and other plastic films, conductive inks and most metal foils used in flexible circuits and membrane switches.
- Excellent strength, toughness, outstanding flexibility, inherent moisture resistance, and low odor
- Withstands extreme thermal shock cycling, from +150°C to well below -50°C, and maintains its electrical integrity over a wide temperature and frequency range
- Can be cured with UV light in seconds, allowing for high-speed production.
- Compatible with our silver filled conductive inks, carbon resistive screen printable inks and silver conductive epoxies.

TYPICAL PROPERTIES

Appearance	Dark blue liquid
Viscosity, Brookfield DV III Ultra, SC4-14 @ 25°C, 12	<4,000 cps
Weight per Gallon @ 25°C	9.9 lbs.
Specific Gravity @ 25°C	1.2
Flash Point, PMCC	>100°C
Shelf Life @ 25°C	6 months in sealed container away from UV light

Z-904

UV CURABLE ANISOTROPIC CONDUCTIVE INK

TYPICAL CURED PROPERTIES

MECHANICAL PROPERTIES

Shrinkage On Cure (Volumetric)	2.4%
Tensile Strength	1,000 psi
% Elongation	13%
Tg by DMA (Dynamic Mechanical Analysis)	41°C

ELECTRICAL PROPERTIES @ 25°C

Volume Resistivity	$1.2 \times 10^{13} \Omega \text{ cm}$ (X and Y axis only)
Surface Resistivity	$5.0 \times 10^{14} \Omega / \text{square}$ (X and Y axis only)
Z-Axis Conductivity	$< 0.01 \Omega / \text{cm}^2$ with 2kg applied pressure

Guidelines are intended to provide a starting point for evaluation. Applied Ink Solutions recognizes that each customer's manufacturing process is unique, and we are available to provide technical assistance to resolve your processing issues. Call us to discuss your application in more detail.

The properties are accurate to the best of our knowledge and Applied Ink Solutions makes no guarantees for customer specifications established in applications where this product is used. Customer assumes responsibility for determining fitness of use in their particular application.

Application Guidelines

Z-904 can be applied by screen printing using stainless steel or monofilament polyester screens from 90-120 mesh, with emulsion thickness from .001" to .003". For thicker coatings, use smaller mesh sizes and thicker emulsions. A polyurethane squeegee with a Shore 'A' durometer between 60 and 70 is recommended. Other conventional methods of application include dip, roll or knife over roll coating, curtain coating or die application. The excellent pot life and UV cure mechanism allow for the heating of the material to precisely control viscosity for consistent application weights.

It is recommended that Z-904 be applied as a single layer, with a dry film thickness of 40 microns or less. The conductive particles in Z-904 are 40 to 45 microns thick, so it is essential that the polymer binder on the printed and cured layer not be taller than the height of the conductive particles contained in the polymer binder. If you cannot feel a coarse texture finish on the surface of a cured film, indicating that the metal particles are protruding above the film surface, the film is printed too thick and it will not be able to conduct in the Z-Axis direction. It is essential to cure the material completely under UV light so that it will have sufficient mechanical properties.

Method of Cure

Z-904 must be exposed to ultraviolet light of the proper wavelength to activate the curing mechanism. This can be done with any ultraviolet light source, which puts out wavelengths of <380 nanometers. The most common commercial light source is the medium pressure mercury vapor (MPMV lamps), electrode or microwave activated arc, with or without spectral enhancement (doped). Cure can also be accomplished with xenon or carbon arc lamp sources, UV lasers or electron beam sources. These sources are available in increasing arc lengths and varying intensities for specific applications from a large number of manufacturers. It is highly recommended that a radiometer be used to verify energy levels in any UV curing system. As a general guideline, lamp input power settings should be at the highest level (300 watts in most systems), and the belt speed should be adjusted until a reading of between 400 and 700 millijoules/square centimeter (mj/cm^2) is obtained on the radiometer. Keep in mind that some systems may require values outside of this range in order to completely cure UV materials. Always verify completeness of curing of UV materials in an initial process capability study, and then use the energy readings that provide this optimal curing as a set up parameter each time the UV line is set up to run production.

Health & Safety

Products manufactured by Applied Ink Solutions are intended for use in an industrial environment by trained personnel. Please follow proper health/safety processes regarding storage, handling and processing of the products.