SPRAYLAT
ELECTRONIC MATERIALS GROUP

Z-Series | Factsheet

Water-Based Paint Technologies

Neptune Z Series

Spraylat's Neptune Series of water-based conductive paints represents the best technology of its type worldwide. They offer similar performance properties to the alcohol-based SOS Series products. In particular, Neptune products offer low VOC for improved environmental friendliness.

Z Series Recyclable Paints

Spraylat has led the way with water-based, recyclable paint products. Our Z3000 series of recyclable products is based on a unique family of polymers that can be readily removed by immersion in an alkaline solution.

Z Series Special Products

Z1240 is a special copper product that provides improved adhesion to many commonly used substrates, including polycarbonates and PC/ABS blends.

599 Water-Based Z Series Products Summary

The Neptune Series includes two principal types of products: hybrid and pure silver.

599-Z6103	**Hybrid**
599-Z6098	**Silver**

The **Z3000 family of recyclable products** includes both copper and silver-based paint formulations. In addition, there is the **Z1240 copper** product for special applications, which is not recyclable.

599-Z3000	**Copper**
599-Z1600	**Copper**
599-Z1232	**Silver**
599-Z1240	**Copper**

Water-Based Technology

Water vs. Solvent-Based Products

The principal advantage of water-based products is their environmental friendliness due to the lower VOC content. Since Neptune products offer similar coating performance to the alcohol-based SOS products, they can be incorporated into most enclosure designs with confidence.

VOC, lbs./gal.	
Neptune	**<3**
Z Series (recyclable)	**~1**

Selection of the "best" product for a given application ultimately involves a balance between performance and cost. When water-based products are chosen, consideration of the environment is normally the key driver in the decision.

In general, material cost is not necessarily the largest component of the total cost when selecting a particular coating. Silver or hybrid paints may be more cost effective than copper-based products when thickness, feature design, actual electrical specifications and production volumes are considered.

Neptune Z Series Performance

Thickness

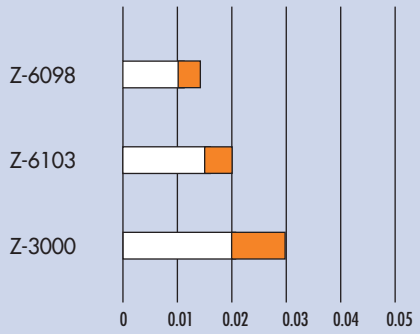
The normal recommended thickness ranges for Neptune products and the Z3000 family of recyclable products are shown below.

	Typical Range of Film Thickness, mm
599-Z6103	**12.5 - 25.0**
599-Z6098	**12.5 - 25.0**
559-Z3000	**12.5 - 37.5**

Electrical Performance

Electrical performance of conductive paints commonly references both ohms-per-square and point-to-point electrical test methods. The following chart provides typical ohms-per-square values for both the Neptune and Z3000 family of recyclable products.

Figure I: Ohms per Square Typical Results



*Shaded Bar Represents a Typical Range of Results

Point-to-point testing is a measure of coating continuity across areas involving various features and geometries. Neptune products provide excellent results in this regard, often providing good conductivity across molded-in features and vertical surfaces. Point-to-point results are comparable to those achieved with SOS solvent-based products.

Z Series recyclable products provide acceptable results in applications where feature complexity is moderate and point-to-point requirements are <2ohms. Specifications of <1ohm require parts of simpler geometry and feature design.

EMI Shielding Properties

The shielding performance of water-based products is excellent, providing comparable or better results than other conductive coating processes. A typical range of results in the ASTM D4935-89 Co-axial Transmission Line Test is shown below.

	Attenuation, dB
599-Z6103	70 - 90
599-Z6098	75 - 90
559-Z3000	65 - 85

*Results are from 30 MHz to 1.5GHz

SAR Protection

SAR (Specific Absorption Ratio) refers to an absorbed dose rate from radiating devices (or transmitters), such as cell phones. It takes into consideration the strenth of the electric field, the distance from the transmitter as well as the mass and conductivity of the tissue receiving the radiation. In particular, a distance of less than 20 cm to the body, is of greatest concern and a focus of FCC, IEC and CENELEC standard. Limits are set in units of W/kg and referred to as maximum permissible exposure levels.

Conductive paints have been found to provide excellent results when tested for SAR performance.

Adhesion and Cohesion

Adhesion of water-based conductive paints is excellent to most plastics used in electronics applications.

Neptune technology has virtually eliminated the particle "pick-off" problems associated with early generation conductive paints. UL 746C ratings, in the cross hatch adhesion test, are readily met. Just as important, the durability and wear resistance of Neptune coatings are excellent — many times better than their predecessors.

The Z3000 family of recyclable products also provides coatings of good durability and cohesion.

In selected applications, Spraylat also offers the Z1240 water-based copper paint. This product can provide improved adhesion to polycarbonate and PC/ABS blends in some cases.

Typical Applications

Conductive paints are used for a variety of purposes as EMC solutions. These include: Electrostatic Discharge (ESD), electromagnetic shielding (EMI), SAR (specific absorption ratio) protection, ground plane and lightning strike protection. The following table provides some common EMC related applications for Nuptune conductive paint products. ■

Telecom
- — Mobile Phones, Pagers
- — Networks, Fiber Optics
- — Satellite Systems
- — Antennas

Business Equipment
- — Desktops
- — Laptops, Palmtops
- — Mainframes

Automotive
- — Displays
- — Control Modules
- — Security, Navigation
- — Entertainment Systems
- — Power Equipment

Consumer Products
- — Toys, Games
- — TVs and VCRs
- — Cable Boxes, Receivers
- — Home Security

Instrumentation
- — Test Equipment
- — Analyzers

Military, Aerospace
- — Avionics
- — Weapon Systems

Industrial Controls

Medical Equipment
- — Monitors
- — Analyzers

Others

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