SPF-Inc Metallograph® Printed Electronics Tech

Metallograph® Digital Conductive Printing Overview

IIMAK Metallograph® conductive thermal transfer printing is the digital complement to analog methods to make thin metallic conductive paths and patterns. It is ideal for short run and variable print production, and it is a simple and versatile prototyping tool for commercial development laboratories and research institutions. In all of these applications, it gives the major benefits of thermal transfer: operational simplicity & reliability, economy and high productivity. These are particularly apparent in any comparison with inkjet. Now, with several years of manufacturing experience, it is ready for the market at large.

Description:

Process: Uses thermal printers. Continuous metal or dielectric ink is transferred from a very thin PET ribbon to the substrate in contact, by selective heating of wiring nibs from the back side.

Metal: The Metallograph® conductor is a thin layer (250 or 350 nm) of vacuum coated aluminum or copper, in turn coated with a thin heat sensitive adhesive. Unlike other metallic conductive inks, Metallograph® is continuous. It needs no curing, drying, sintering or chemical treatment once printed.

Durability: Metallograph® has excellent flexibility, rub resistance, adhesion and chemical stability.

Printers: Common simple monochrome roll fed label and identification thermal printers, with fixed print heads are used for Metallograph®. Native resolution can be 300 or 600 dpi with speeds of 2 ips (50 mm/s) or faster. Suitable 4 inch (110 mm) printers are already commonly used for RFID printing and programming. Printers to 12 inches (305 mm) are available. Multi-color printers can be used to build multi-layer structures. Machine pricing is modest, and at least 1/10th inkjet of equivalent performance.

Substrates: Metallograph® conductive ink bonds to all good quality thermal transfer substrates, and to most flexo and screen substrates as well. This includes all label facestocks and substrates except those that are very heat sensitive. RFID antennas can be printed on substrate, eliminating the inlay.

Electrical: Volume resistivity is 3 μΩ-cm, or about twice pure metal of the same thickness. Maximum current density is about 120 mA/cm^2.

Connections: Standard conductive adhesives. Suitable chips by direct die.

Uses:

Research and development: Single and short runs for design testing and verification, and prototype assembly. As the same ribbon can be used for manufacturing there is no separate qualification of a different conductive material. Superior to inkjet for nearly all production metrics.

Manufacturing: Provides the Digital Value Proposition: on-machine proofing; short runs for market investigation, development and verification; just-in-time production, reduction in costly inventory, waste reduction, supply chain simplification, vertical integration. Productivity is very useful. A 4 inch printer can produce about 10,000 of the antennas shown above every hour, all day long.

Applications

RFID: UHF RFID Antenna has been proven with 3 years commercial experience. In comparative tests with commercial etched aluminum and copper antenna, Metallograph® read range has been mostly within 60 to 85% of etched. In some situations its read range exceeded etched.

Others: Metallograph is also being used in development of printed circuits, device connections, medical sensors, intelligent packaging, electroluminescent lighting and others not divulged.

Contact:

Metallograph Tech *New Hope, Pennsylvania, USA*
metallograph@spf-inc.com +1 215 862 9434 Metallograph.tech