

ECOPLATE™

Metallic Conformal Coating Process

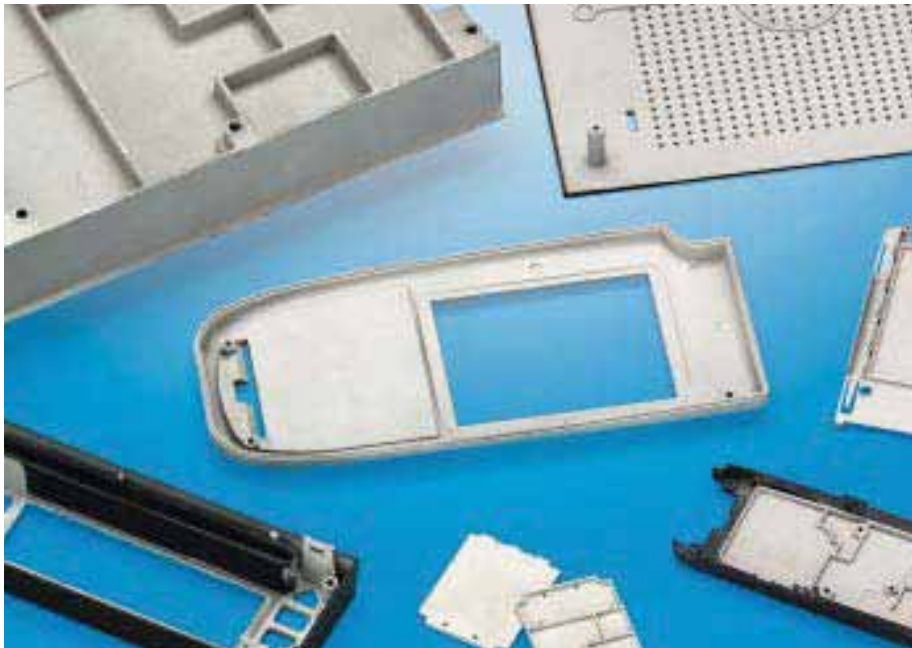


Customer Value Proposition:

While the ECOPLATE process for applying a metallic conformal coating lends itself to use with many metals or alloys, Chomerics' Research and Development has derived a high-purity tin/zinc alloy suitable for the full range of today's highest performance electronic applications. ECOPLATE 5030 is a pure metal wire with a metallurgical composition free of defects or contaminants. When applied with the automated ECOPLATE process, it conforms to the substrate much like paint, but with the superior EMI shielding performance of solid metal. This highly engineered laminar film has low porosity and oxidation, and requires no curing or further processing.

The ECOPLATE 5030 alloy was developed specifically for Chomerics' automated ECOPLATE coating process, which produces a uniform film build of the desired thickness. In a single pass, the low-melting point alloy is atomized and sprayed under tightly controlled particle size, temperature and velocity. The molten metal flows, flattens and cools almost instantaneously, possessing insufficient thermal mass to deform thin-walled plastic substrates.

A typical film build for ECOPLATE 5030 material is 25 µm (0.001 inch), but significantly thicker layers or very thin layers down to 12.5 µm (0.0005 inch) are achievable, with equal ease of application on horizontal surfaces or vertical walls. Because the alloy requires no polymer compounding and is not a precious metal, the material cost for a 1-mil film layer is substantially lower than that of plating or painting, while EMI shielding performance is superior.



Adhesion:

Adhesion of the ECOPLATE 5030 alloy is excellent with standard plastics and metals used in electronic device parts and housings. These include PC, ABS, PC/ABS, polysulfone and other thermoset or thermoplastic injection molded polymers; and aluminum, magnesium and zinc die-cast alloys. Crosshatch adhesion testing of ECOPLATE 5030 material applied to these substrates, conducted per ASTM D3359-78 Method B, yield consistent ratings of 5B. Its corrosion resistance makes ECOPLATE 5030 material an excellent choice for ensuring the long-term conductivity of metallic housings. Flexibility of the 5030 film following application to a variety of plastic substrates is also excellent, as demonstrated in successful 180° bend over tests with a 0.500-inch (12.7 mm) mandrel.

Environmentally Friendly:

ECOPLATE 5030 material and the ECOPLATE process are free of solvents, harmful vapors and corrosives. There is no solvent-bearing particulate or mask residue to wash off with chemicals. There is also no need for expensive wastewater or vapor treatment, and no special shipping, storage or handling requirements.

Compatibility:

Following application, ECOPLATE 5030 material withstands low temperature solder operations, such as soldering of a shielded grounding cable onto connector back shells. The ECOPLATE alloy surface also functions as a replacement for plating or metallization of parts in preparation for robotic dispensing of Cho-Form® form-in-place gasketing.

ECOPLATE - Product Information

Table 1

MATERIAL SPECIFICATIONS		
Typical Properties	Test Procedure	ECOPLATE 5030
Composition	-	Tni/Zinc
Alloy ratio	-	80/20
Typical film build, inch (mm)	-	0.0005 to 0.0015 (12.5 to 37.5)
Typical surface resistivity, ohm/sq., @ 0.001 inch (0.03 mm)	Chomerics 95-40-5104*	0.005
Adhesion	ASTM D3359-78 Method B	5B
Film porosity, %	-	<6
Melting temperature, °C	-	270
Maximum continuous use temperature, °C	-	200
Shielding effectiveness, dB	CHO-TM-TP08*	
100 MHz		90
500 MHz		90
2 GHz		90
10 GHz		75

* Copies of these test procedure are available from Parker Chomerics Applications Engineering Department.

Ordering Information:

ECOPLATE 5030 material is currently the only standard metal/alloy offered for application with the ECOPLATE process. For consideration of additional materials, contact Parker Chomerics Application Engineering Department at 781-935-4850. When ordering, use the following part number.

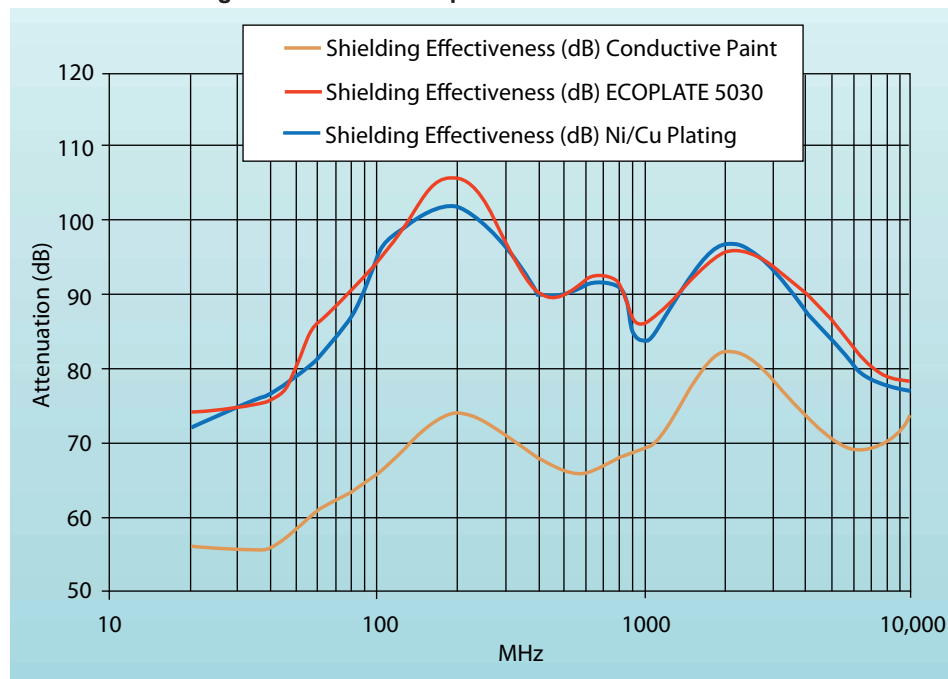
19 — 53 — ZXXXX — 5030

Identifies
ECOPLATE
Process

Chomerics
4-digit
Job Number

ECOPLATE
Material

FIGURE 1 Shielding Effectiveness Comparison



Test Method - Chomerics TP08 Modified
Reference Style B: 26 x 26 inch (66 x 66 cm) Test Panel

ECOPLATE - Product Information

About the

ECOPLATE

Metallic Conformal Coating Process

Parker Chomerics ECOPLATE process is an automated application and material solution for metallizing plastic electronic enclosures. It also replaces conversion coating on metallic enclosures. Its advantages are achievable with runs of 100 or 1,000,000+ parts. ECOPLATE robotic technology produces a superior performance conformal coating without the drawbacks of traditional coating technologies. This 100% metal solution eliminates runs, edge pulls, corner puddles, and voids. Free of solvents and corrosives, the lowtemperature process is environmentally friendly and ideal for thin-walled plastic injection molded parts.



Fast, Cost-Effective Part Processing

The five-step, proprietary ECOPLATE coating process is carried out in a single chamber using state-of-the-art robotic equipment. A typical throughput time is 37 seconds.

The economics of the automated ECOPLATE process are such that it is cost effective even for runs as small as 100 parts.



Step 1 - Loading

Parts are pre-loaded onto pallets and placed on the conveyor. Pallets are up to 18 in. wide x 24 in. long x 10 in. high (46 x 61 x 25 cm).



Step 2 - Surface Preparation

A mild grit blast cleans and roughens the surface of the part to ensure reliable long-term adhesion of the ECOPLATE coating. The engineered grit medium is of proprietary formulation.



Step 3 - Air Jet

To ensure a defect-free surface, air is sprayed across the parts to remove and collect any residual loose grit medium.



Step 4 - Coating

Under tightly controlled process parameters for particle size, velocity, temperature, distance, feed rate and thickness, the parts receive an atomized spray of pure metal ECOPLATE alloy. The molten metal flows and flattens immediately to form a laminar film as thin as 12.5 μm (0.0005 in.). Heat mass of the molten metal is sufficiently small that plastic substrates are unaffected.



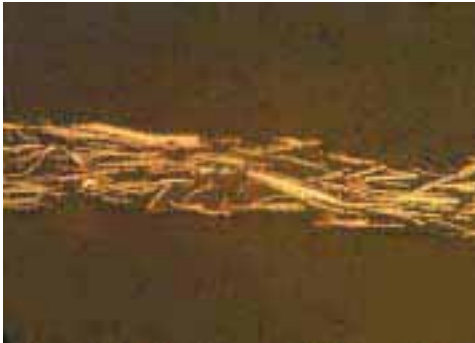
Step 5 - Unloading

No curing or further processing are required. Coated parts are conveyed to the unloading station, ready for further assembly or packaging.

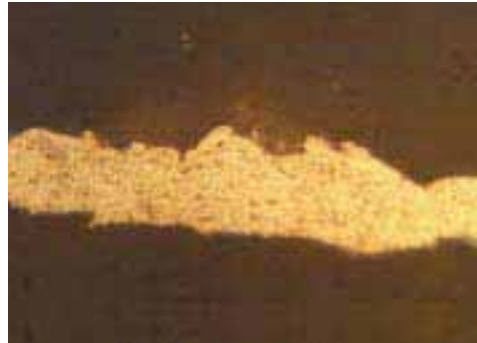


Compare the results!

1-mil applications in cross-sectional view, 500X



Metal flakes in paints leave substantial pockets of non-conductive polymer, compromising conductivity of the enclosure.



The ECOPLATE process applies a tenacious, pure metal film with <6% porosity, ensuring very high conductivity and reliability.

INTEGRATED TOOLING AND MASK DESIGN

Parker Chomerics uses cost-effective 3D solid modeling to design the reusable masking systems, which are produced in either metal or silicone rubber. The ECOPLATE process applies the metal conformal layer in a single pass. Because the ECOPLATE process is solvent-free, it circumvents the problems of unwanted particle overspray resulting from the "solvent cloud" associated with painting.



SUPPLY CHAIN MANAGEMENT & CONTRACT MANUFACTURING

More than ever, manufacturers of electronic devices and enclosures seek to integrate production processes to the greatest extent possible. For EMI shielded housings, choosing Parker Chomerics as the lead vendor to manage the overall

supply chain offers important cost and quality benefits:

- reduced production times - simpler logistics, better scheduling
- cost containment - fewer vendors, less downtime
- optimized designs - faster shielding application
- greater accountability



www.chomerics.com
www.parker.com/chomerics

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