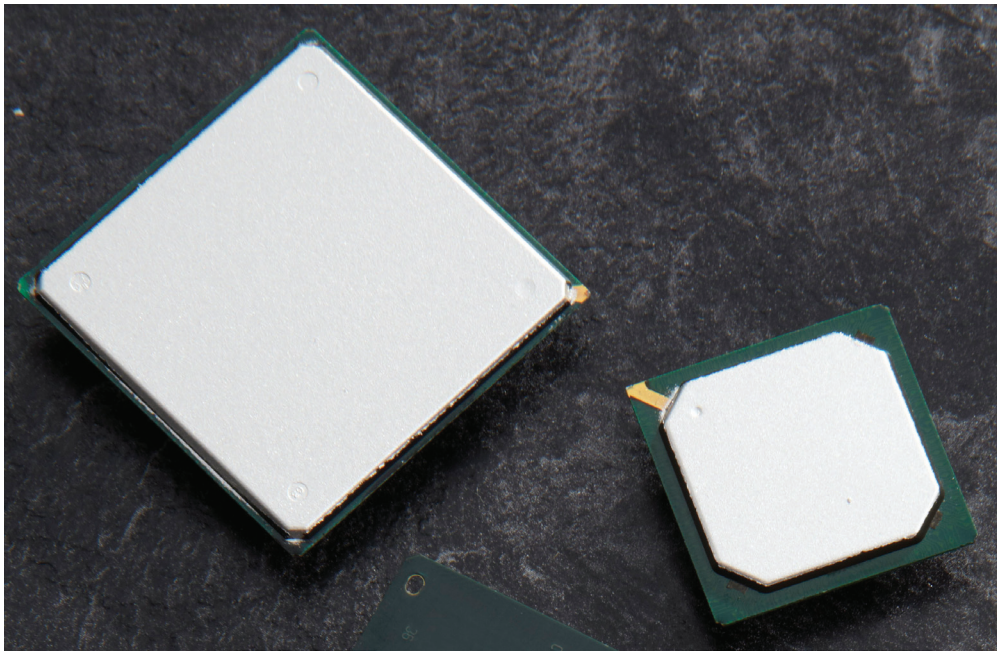
CHO-SHIELD® 571

HIGHLY CONDUCTIVE SILVER EPOXY EMI COATING FOR SEMICONDUCTOR PACKAGES

Customer Value Proposition:

CHO-SHIELD® 571 is a highly conductive, advanced coating developed for high volume, precise spray application on circuit boards and semiconductor packages . Combined with innovative technologies and packaging designs, CHO-SHIELD 571 can provide board level or package level EMI shielding of electrical components.

Applied correctly, CHO-SHIELD 571 can replace stamped metal cans, saving valuable board space and reducing the overall cost of board level EMI shielding. CHO-SHIELD 571's polymer system has been custom formulated to closely match the coefficient of thermal expansion (CTE) of typical epoxy molding compounds resulting in great adhesion and environmental stability of the coating on semiconductor devices.



Features and Benefits:

• Two component	• Designed for high volume spray application. Minimum 12 hour working life at room temperature.
• Silver flake filler	• Excellent conductivity and EMI shielding of components.
• Epoxy coating	• Good adhesion to semiconductor packaging materials due to CTE (coefficient of thermal expansion) match of polymer. Environmentally stable, Heat (100 hrs @ 150°C (302°F), Humidity 85% R.H.), Thermal-cycling [85°C (185°F)/85% R.H.] Withstands wave solder temperatures in excess of 262°C (500°F).

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Application

Recommended Preparation

1. Clean the substrate: The substrate surface should be clean, dry and free of oils, release agents, dirt and lint.
2. Mix the material: First mix the Part A material well by placing the can on a paint shaker for 3-4 minutes or mix by hand with a large spatula until all solids are in a homogeneous suspension. Check that no unmixed material remains on the bottom or sides of the container. Next weigh out the appropriate mix ratios of Part A and Part B into a paint can and place mix back on paint shaker for an additional 3-4 minutes (you may also mix by hand with a large spatula until mix is homogenous).
3. Optional: Strain the material to reduce or eliminate the potential for clogging the spray nozzle. The paint can be strained through a course mesh (1000 micron) flat strainer into a pressure pot for spray. All metal fillers should be transferred, although a small amount of filler clusters might be collected in the strainer.

Fluid Delivery System

Low Volume Manufacturing- Spray

Use a standard HVLP spray gun with approximately 20-40 psi (138-276 kPa) atomizing air.

A fluid nozzle with a minimum orifice diameter of 0.040 (1.016) is recommended.

To obtain maximum adhesion and conductivity, dry spraying should be avoided. Adjust the spray pressure to achieve a proper wet film when applying the conductive coating.

Moderate Volume Manufacturing- Spray Gun and Pressure Vessel with Agitation

Use a pressure pot (15 psi, 103 kPa, typical) with large diameter, paddle type agitator at low mixing speed to keep the metal fillers in uniform suspension. Conventional spray equipment such as HVLP (High Volume, Low Pressure) or DeVilbiss EGA 503 with propeller agitator pressure pots may be used for spray application with approximately 20-50 psi (138-345 kPa) atomizing air. Use lowest pressure possible. Re-circulation of the paint from the mixing pot through the spray gun and back via a pump delivery system is recommended for greater filler uniformity.

High Volume Manufacturing- Robotic Spray Systems

For large volume, precise spray applications, a robotic spray system with constant fluid recirculation should be use to keep conductive particles from separating and settling in the lines. Both ultrasonic and HVLP spray heads may be used to apply the conductive coating. Important factors to consider when determining spray head type are part geometry, masking requirements, overspray tolerance, paint transfer efficiency, and manufacturing cycle time. A fluid nozzle with an orifice diameter of 0.020 to 0.040 inch (0.508 to 1.016 mm) is recommended.

Nominal Dry Film Thickness

A nominal dry film thickness of 0.001 inches (25 µm, 1 mils) is recommended to obtain > 100 dB shielding effectiveness from 80 MHz to 18 GHz. However, a thinner or thicker coat may be acceptable depending on the shielding requirements of the device being protected. Allow material to dry 10-20 minutes at room temperature between coats to avoid solvent entrapment.

Drying Conditions

1. Dry at room temperature for 10-20 minutes.
2. Continue drying for 15 minutes at 125°C ± 2°C (257°F ± 5°F) for 0.001 inches (25 µm, 1 mils) thickness.

   Dry longer if thicker film, shorter if thinner film, to achieve desired conductivity.

Clean-up

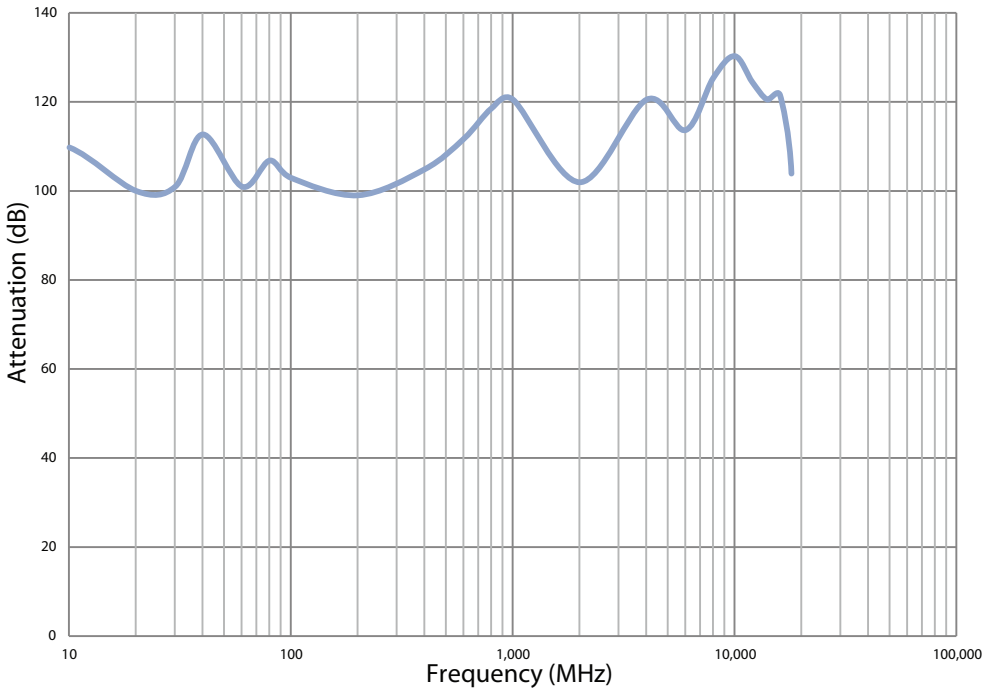
The spray system, including spray gun, mixing pot, and containers can be cleaned with MEK or Acetone (VOC exempt solvent). Masks can be power washed with Challenge 485S barrier coat.

Storage and Handling

CHO-SHIELD 571 should be stored at 10ºC to 30ºC (50ºF to 86ºF) and has a 9 month shelf life from the date of manufacturing in the original sealed container. CHO-SHIELD 571 is a flammable liquid. Please consult the material safety data sheet for proper handling procedures before use.

Figure 1

CHO-SHIELD 571 Typical Shield Effectiveness PER CHO-TM-TP11*



* This test Method is available from Parker Chomerics.

CHO-SHIELD 571 - Product Information

Table 1 Typical Properties

CHO-SHIELD 571			
Typical Properties	**Typical Values**	**Test Method**	
Polymer	Epoxy	N/A	
Filler	Silver	N/A	
Mix Ratio (A:B by weight)	100 : 8.3	N/A	
Color	Silver	N/A	(Q)
Spray Viscosity	19 to 25 seconds	Zahn Cup Number 2	(Q)
Surface Resistance (max.) at 0.001 inches (25 µm, 1 mil)	<= 0.010 ohms / square	CEPS-0002	(Q/C)
Shielding Effectiveness (see Figure 1)	>100 dB	CHO-TM-TP11*	(Q)
Recommended Dry Film Thickness	.001" (25 µm)	N/A	
Wet Density	1.3	ASTM D792	(Q/C)
Continuous Use Temperature	-40 to 125°C (-40 to 257°F)	N/A	(Q)
Pot Life	12 hrs	N/A	(Q)
Drying Time- Room Temperature Tack Free	1.0 hr. @ 21°C (70°F)	N/A	
Drying Time- Room Temperature Full Dry	None	N/A	
Drying Time- Elevated Temperature Full Dry	**Cure Cycle Option 1:** 0.25 hr @ 21°C (70°F), followed by 1.0 hr @ 121°C (250°F) **Cure Cycle Option 2:** 0.25 hr @ 21°C (70°F), followed by 2.0 hr @ 85°C (185°F)	N/A	
Shelf Life at 21°C (70°F), unopened, from Date of Manufacture	9 months	N/A	(Q)
Calculated VOC	308 g /L	Calculated	
Theoretical coverage at recommended dry film thickness	0.060 ft^2/gram 0.018 m^2/gram 289 ft^2/gallon	N/A	

Notes: N/A – Not Applicable, (Q/C) - Qualification and Conformance Test, (Q) - Qualification Test, the above properties are based on Cure Cycle 1.
* This test Method is available from Parker Chomerics.

Ordering Information

Product	Weight (grams)	Packaging	Chomerics Part No.	Primer Included
CHO-SHIELD 571	281	2 component kit A: 1 pint aluminum can B: 4 fluid ounce amber bottle	52-01-0571-0000	Not Required

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

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