

## CHO-SHIELD® 2056

### Silver/Copper-Filled Acrylic Coating for EMI Shielding

CHO-SHIELD® 2056 is an electrically conductive, one-component silver and silver/copper-filled acrylic coating that is specially formulated for application on plastics to provide high levels of EMI shielding.

CHO-SHIELD 2056 is ideal for use on medical electronic enclosures and assemblies which require high level, reliable EMI shielding performance and may benefit from silvers' antimicrobial properties. The excellent electrical conductivity of CHO-SHIELD® 2056 paint allows for thinner applied coatings, saving time and money in processing. Thinner coatings limit material wastage due to overspray and reduce the frequency of mask washing steps.

CHO-SHIELD 2056 conductive coating is ideal for a variety of applications, including:

- High levels of EMI shielding (see shielding effectiveness curve Fig. 1)
- Anti-static protection
- Surface grounding
- Coating of ABS, PC/ABS, and many other types of plastic enclosures



### Product Benefits:

- Excellent EMI shielding performance, greater than that of traditional silver-plated copper coatings, with only half the film thickness
- Good adhesion characteristics to most plastics
- One component, ready to use with simple mixing
- Good environmental and abrasion resistance
- Excellent leveling. Wets and covers surfaces smoothly.
- Easy to apply with standard spray paint equipment
- Standard dry-times for efficient, cost-effective application
- Excellent electrical conductivity and cost-effective addition to electronic enclosures and assemblies
- Meets UL Specification 746-C for adhesion

# 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:  
Mix the material well on a paint shaker (typically 1-minute for one-gallon can). 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 and the sides of the container.
3. Optional: Strain the material to reduce or eliminate the potential for clogging the spray nozzle. The paint can be strained through a coarse 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.
4. Optional thinning:  
Standard thinning can be accomplished with MEK (methyl ethyl ketone) solvent.

During humid days (relative humidity >50% and temperature >85°F/30°C), use n-Butyl alcohol and add up to 8 fluid ounces per gallon of paint to eliminate blushing (a white tint on the drying surface).

## Fluid Delivery System

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.

For large volume applications, a robotic spray system with an HVLP spray gun should be used to minimize material loss due to overspray and maximize paint transfer efficiency. Siphon feed equipment can be used for small or prototype runs.

## Spray Gun and Pressure

Use a standard air gun with approximately 20-50 psi (138-345 kPa) atomizing air.

A fluid nozzle with an orifice diameter of 0.040 to 0.070 inch (1.016 to 1.778 mm) is recommended.

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

## Nominal Dry Film Thickness

A nominal dry film thickness of 0.001 inches (25 µm, 1 mil) is recommended to obtain > 75 dB shielding effectiveness from 80 MHz to 10 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 30 minutes at 150°F ± 10°F (65°C ± 5.5°C) for 0.001 inches (25 µm, 1 mil) thickness.

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

**Note:** Drying at room temperature for 24 hours will achieve similar performance.

## 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 2056 should be stored at 50°F to 86°F (10°C to 30°C) and has a 12 month shelf life from the date of manufacturing in the original sealed container. CHO-SHIELD 2056 is a flammable liquid. Please consult the material safety data sheet for proper handling procedures before use.

# Product Information

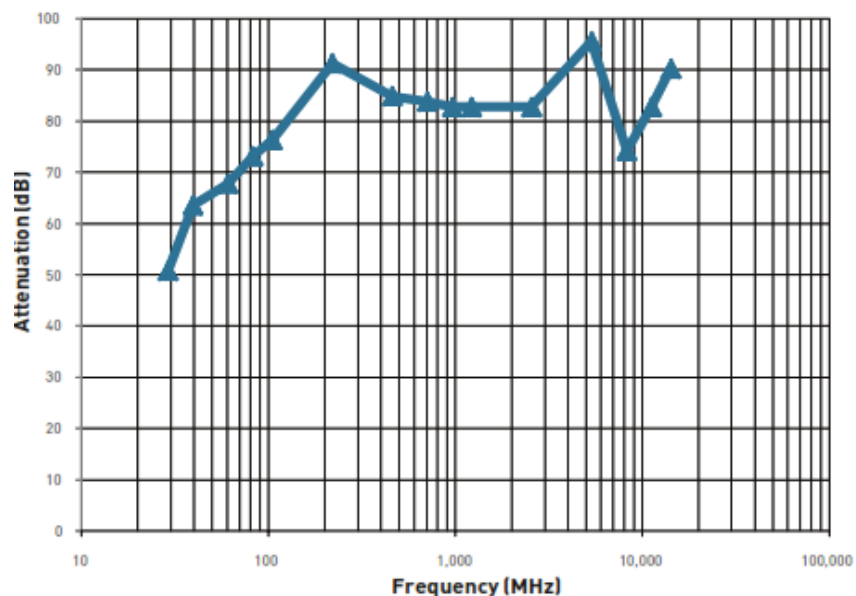
Typical Properties	CHO-SHIELD® 2056
Polymer	Acrylic
Filler	Silver-Plated Copper and Pure Silver Flakes
Shielding Effectiveness	>75 dB (80 MHz - 10 GHz)
Surface Resistance (max.) at 0.001 inches (25 µm, 1 mil) (CEPS-0002)	<0.030 ohm/sq.
Adhesion (ASTM D-3359)	5B
Average solids (weight)	32%
Viscosity (Zahn Cup No. 2)	14 to 19 seconds
Specific Gravity (ASTM D792)	1.1 ± 0.2
Drying Time – Room Temperature Tack Free	5 minutes at RT
Drying Time – Room Temperature Full Dry	24 hours at RT
Elevated Temperature Full Drying time	10-20 min. at room temperature then 30 minutes at 150°F (65°C)
Continuous Use Temperature	-40 to 212°F (-40 to 100°C)
Shelf Life at 70°F (21°C)	12 months
Theoretical coverage	190 sq ft /gal at 0.001 inches (25 µm, 1 mil)
Calculated VOC	718 g/L

## Ordering Information

Product	Part Number	Unit Size
CHO-SHIELD® 2056	52-03-2056-0000	1 gallon

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.

Figure 1 - CHO-SHIELD® 2056 Typical Shielding Effectiveness Per CHO-TP09



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TB 1030 EN March 2011 Rev A