Product No. 16062 – PELCO® Conductive Silver Paint

Description

Product No. 16062 – PELCO® Conductive Silver Paint is a highly conductive acrylic paint designed to take conductive paths or reduce electromagnetic or radio frequency interference (EMI/RFI). Long-term protection from EMI/RFI is assured by its durable acrylic resin that minimizes loss of metallization through rubbing, and by the oxidation resistant silver that slows down conductivity degradation with age. The flake shape helps ensure maximum points of contact to ensure better conductivity. In addition, loss of shielding through paint peeling is unlikely since the acrylic resin system was shown, in UL related testing, to adhere to even difficult substrates like AMS and polycarbonates.

Applications & Usages

Product No. 16062 – PELCO® Conductive Silver Paint's primary application is to provide an excellent-conductivity EMI/RFI shielding suitable for harsh environments. It may also act as a conductive base for applications where it is necessary to impart the highest degree of conductivity to a surface. As well, the silver is non-magnetic, offering a low relative permeability that provides reasonable skin depths, which makes it suitable for microwave transmissions applications.

Benefits and Features

- **Meets MIL-STD-883H** (Volume Resistivity = 0.0002 Ω·cm)
- **High Surface Conductivity** (≥15 Siemen)—**Low Surface resistance** of ≤0.066 Ω/sq @ 1 mil
- **Repairable and removable thermoplastic paint system**
- **Tough and durable coat with excellent weatherability**
- **Corrosion resistant coating:** Salt-Spray Tested
- **Stronger adhesion than water based coatings**
- **Rub off resistant**
- **Median attenuation** 75 dB ± 20 dB per 25.4 µm (~1.0 mil) for frequency range of 10 MHz to 18 GHz

ENVIRONMENT
Meets RoHS directive
Low-VOC

Curing & Work Schedule

Properties	*Value*
Dry to Touch (Liquid) [a)]	3 to 5 min
Recoat time (Liquid) [a)]	2 min
Full Cure at room temp.	24 hour
Full Cure at 65 °C	30 min
Shelf Life	1 year
Storage Temperature Limits [a)]	-5 to +40 °C [+23 to +104°F]

a) Assumes let 1.00:0.75 let down with thinner.

b) The product must stay within the storage temperature limits stated.

Service Ranges

Properties	*Value*
Service Temperature	-40 to +120 °C [-40 to +248 °F]
Maximum coverage per 900 mL[c)]	<168 000 cm^2 [<180 ft^2]
Maximum coverage per US gallon[c)]	<709 000 cm^2 [<763 ft^2]

c) Idealized estimate based on a coat thickness of 25 µm [1.0 mil] and 65% transfer efficiency

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Principal Components

Name	CAS Number
Silver	7440-22-4
Acrylic Resin	9003-01-4
Acetone	67-64-1
Ethanol	64-17-5
Toluene	108-88-3

Properties of Cured Product No. 16062 – PELCO® Conductive Silver Paint

Electric & Magnetic Properties	Method	***Value***	
Volume Resistivity [a]	Method 5011.5 in MIL-STD-883H	0.0002 Ω·cm	
Surface Resistance		Resistance [b]	Conductance [b]
: 1 × coat @ 1 mil	square probe	0.066 Ω/sq	15 S
: 2 × coats @ 2 mil	square probe	0.055 Ω/sq	18 S
: 3 × coats @ 2.5 mil	square probe	0.040 Ω/sq	25 S
Magnetic class		Diamagnetic (Non-magnetic)	
Relative permeability		<1.0	
Shielding Attenuation for 33 µm [1.0 mil]	IEEE STD 299-1997		
10 to 100 kHz	"	54 dB to 75 dB	
100 kHz to 1 MHz	"	50 dB to 65 dB	
1 MHz to 10 MHz	"	54 dB to 65 dB	
10 MHz to 100 MHz	"	41 dB to 54 dB	
100 MHz to 1 GHz	"	35 dB to 67 dB	
1 GHz to 10 GHz	"	41 dB to 59 dB	
10 GHz to 18 GHz	"	36 dB to 72 dB	

Physical Properties	***Method***	***Value***
Resin technology	—	Lacquer (Thermoplastic)
Color	Visual	Metallic Silver Grey
Abrasion resistant	—	Yes
Blister resistant	—	Yes
Peeling resistant	—	Yes
Peeling resistant	—	Yes

Environmental & Ageing Study	***Method***	***Value***
Salt Spray Test: 7 day @35 °C +Salt/Fog	ASTM B117-2011	
Cross-hatch adhesion	ASTM D3359-2009	5B = 0% area removed
Cracking, unwashed area	ASTM D661-93	None
Visual Color, unwashed area	ASTM D1729-96	Severe yellowing & discoloration
Peeling, unwashed area	ASTM D1729-96	None

Note: The first coat thickness is typically around 25 µm [1.0 mil].

a) Tested by an external and independent laboratory using four point probe

b) Surface resistance is given in Ω/sq and the corresponding conductance in Siemens (S or Ω^{-1})

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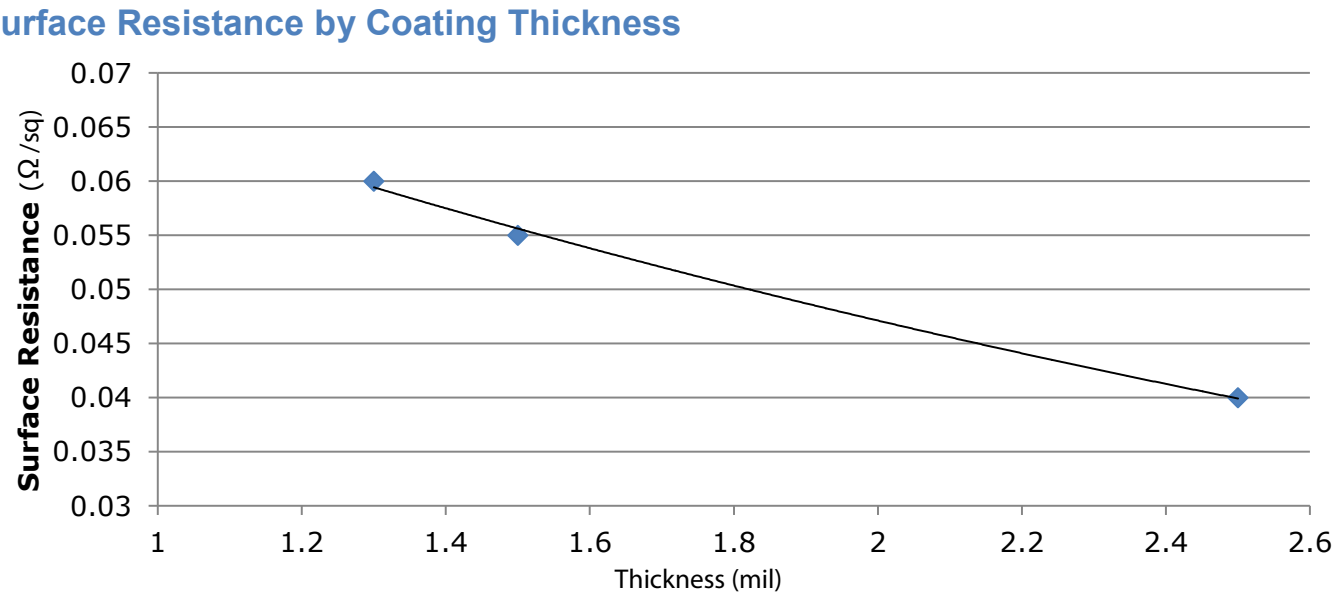

Figure 1. Silver coating surface resistance at different thicknesses

Properties of Uncured Product No. 16062 – PELCO® Conductive Silver Paint

Physical Property	*Mixture*
Color	Metallic Silver Grey
Density @25 °C	2.15 g/mL
Solids Percentage (wt/wt)[a)]	~73%
Viscosity at 25 °C [77 °F][b)]	~8,000 cP
Flash Point	-16 °C [3.2 °F]
Odor	Ethereal, benzene-like

a) Percentage for liquid only (before thinning) b) Brookfield viscometer

Compatibility

Chemical – The silver filler is quite resistant to oxidation, except in environments that contain contaminants like H_2S or ozone which tarnish its surface. Unlike many other metal oxides, silver oxide remains conductive so degradation do to oxidation is not as bad.

The thermoplastic resin is dissolved by common paint solvents like toluene, xlyene, acetone and MEK. This allows great coating repair and work characteristics, but it does make the coating unsuitable for solvent rich environments.

Adhesion – The product No. 16062 – PELCO® Conductive Silver Paint coating adheres to ABS, PBT, PC, PU, PVA, acrylics, metals, expoxies and wood; however, it is not compatible contaminants like water, oil, and greasy flux residues that may affect adhesion. If contamination is present, clean the surface to be coated first.

Storage

Store between -5°C and 40ºC (23ºC and 104ºF) in dry area.

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