



Super Shield™ Silver Conductive Coating 842 Technical Data Sheet

Description

The 842 *Silver Conductive Coating* is a one-part durable acrylic lacquer pigmented with an extremely conductive silver flake, packaged in convenient aerosol format. It utilizes a solvent based system with no heat cure necessary. The cured coating is smooth, hard, and abrasion resistant. It provides good adhesion to plastics, extreme conductivity, very strong high frequency shielding, and extreme corrosion resistance, even in harsh marine environments.

Applications & Usages

The 842 is designed to provide a conductive coating to the interior of plastic electronic enclosures to suppress EMI/RFI emissions. It excels when the highest level of shielding is required.

It is optimal for military, medical, or other mission critical applications where the highest levels of attenuation are essential.

The 842 is commonly used by manufacturers of these devices:

- Medical Equipment
- Military equipment
- Scientific equipment
- Test Equipment
- Communication devices
- Cellphones, laptops, PDA's
- Consumer electronics
- Automotive applications
- Aerospace applications
- Drones and other RC vehicles

Other applications for 842 include:

- Repairing damage to existing shielding
- Conductive undercoat for electroplating
- Providing electric continuity for circuits
- Circuit repair

It is a simple effective solution to impart maximum conductivity to a surface.

Benefits and Features

- **Meets MIL-STD-883H**
- **Provides extreme EMI/RFI shielding over a broad frequency range**
- **Volume resistivity of 0.0002 $\Omega \cdot \text{cm}$**
- **Smooth, durable, and abrasion resistant**
- **Available in liquid format**
- **Quick dry time, no heat cure required**
- **Strong adhesion to acrylic, ABS, polycarbonate, and other injection molded plastics**
- **Excellent adhesion to wood, ceramics, copper, and aluminum**
- **Extremely corrosion resistant, suitable for harsh marine environments**

ENVIRONMENT

Meets RoHS directive
Low-VOC



ISO 9001 Registered Quality System.
Burlington, Ontario, Canada QMI File # 004008

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842-Aerosol

Usage Parameters

Properties	Value
Dry to Touch (liquid)	3 to 5 min
Recoat time (liquid)	2 min
Drying Time @25 °C [77 °F]	24 h
Drying Time @65 °C [149 °F]	30 min
Shelf Life	1 y
Theoretical 340G Spray Can Coverage ^{a)}	≤2 660 cm ² ≤400 in ²

a) Idealized estimate based on a coat thickness of 50 µm [2.0 mil] and 50% transfer efficiency

Temperature Ranges

Properties	Value
Constant Service Temperature	-40 to 120 °C [-40 to 248 °F]
Intermittent Temperature Limits	-50 to 125 °C [-58 to 257 °F]
Storage Temperature Limits ^{b)}	-5 to 40 °C [23 to 104 °F]

b) The product must stay within the storage temperature limits stated. **ATTENTION!** Aerosol container will be crushed at ≤-26.5 °C [≤15.7 °F].

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 842

Electric & Magnetic Properties	Method	Value	
Volume Resistivity	Method 5011.5 in MIL-STD-883H	0.0002 Ω·cm	5 000 S/cm
Surface Resistance	square probe	<i>Resistance</i> ^{a)} 0.065 Ω/sq	<i>Conductance</i> ^{a)} 15 S
1 coat @1 mil	square probe	0.055 Ω/sq	18 S
2 coats @2 mil	square probe	0.040 Ω/sq	25 S
2.5 coats @2.5 mil			
Magnetic Class		Diamagnetic (Non-magnetic)	
Relative Permeability		<1.0	
Shielding Attenuation ^{b)} for 50 µm [2.0 mil]	IEEE STD 299-1997		
>10 to 100 kHz	"	79 dB to 88 dB	
>100 kHz to 1 MHz	"	81 dB to 90 dB	
>1 MHz to 10 MHz	"	52 dB to 81 dB	
>10 MHz to 100 MHz	"	52 dB to 77 dB	
>100 MHz to 1 GHz	"	72 dB to 85 dB	
>1 GHz to 10 GHz	"	66 dB to 85 dB	
>10 GHz to 18 GHz	"	66 dB to 81 dB	

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i>	
Paint Type	—	Lacquer (thermoplastic)	
Color	Visual	Light brown	
Abrasion Resistant	—	Yes	
Blister Resistant	—	Yes	
Peeling Resistant	—	Yes	
Water Resistant	—	Yes	
<i>Environmental & Ageing Study</i>	<i>Method</i>	<i>Value</i>	
Salt Spray Test: 7 day @35 °C +Salt/Fog	ASTM B117-2011	5B = 0% area removed	
Cross-hatch Adhesion	ASTM D3359-2009		
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) Surface resistance is given in Ω/sq and the corresponding conductance in Siemens (S or Ω⁻¹)
- b) Minimum and Maximum value for range as determined by external testing by an independent laboratory.

Surface Resistance by Coating Thickness

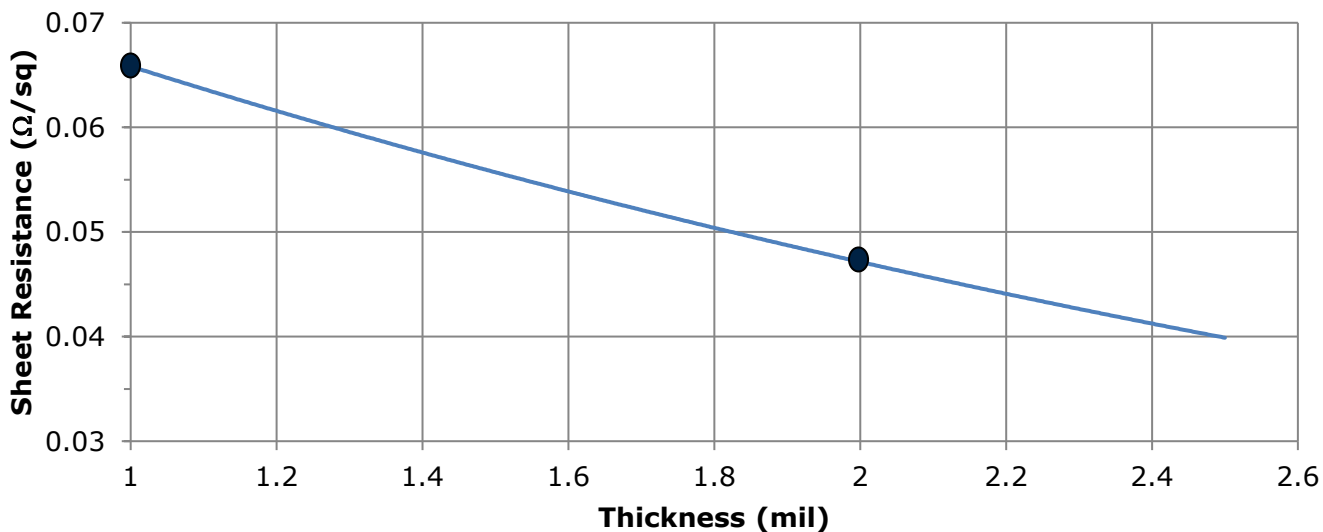


Figure 1. Silver coating surface resistance at different thicknesses

Properties of Uncured 842

<i>Physical Property</i>	<i>Mixture</i>
Color	Silver Grey
Density @25 °C	2.15 g/mL
Solids Percentage (wt/wt) ^{a)}	19%
Flash Point	-16 °C [3.2 °F]
Odor	Ethereal, benzene-like

a) Percentage for liquid only (before thinning)

Compatibility

Chemical—The silver filler is quite resistant to oxidation, except in environments that contain contaminants like H₂S or ozone which tarnish its surface.

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

Adhesion—The 842 coating adheres to most plastics used to house printed circuit assemblies; however, it is not compatible with contaminants like water, oil, and greasy flux residues that may affect adhesion. If contamination is present, clean the surface to be coated first.

842 Adherence Compatibility

<i>Substrate</i>	<i>Note</i>
Acrylonitrile Butadiene Styrene (ABS)	Chemically etches ^{a)} and adheres well to this substrate.
Polybutylene Terephthalate (PBT)	"
Polycarbonate	"
Polyvinyl Acetate (PVA)	"
Acrylics or Acrylic Paints	Adheres well to clean surface
Polyurethane	Adheres well to clean surface for most urethane types
Wood	Adheres well with surface preparation

a) Etching is similar to sanding, except that it also softens the surface helping to meld the paint to the plastic for superior adhesion.

ATTENTION! Use with care on thin plastics or on plastics where you want to keep original surface intact. The 842 spray contains a controlled amount of solvents designed to chemically etch plastic surfaces to help adhesion by melding the acrylic coating into the plastic substrate. This prevents flaking or peeling.

Storage

Store between -5 and 40 °C [23 and 104 °F] in dry area.

Health, Safety, and Environmental Awareness

Please see the 842 **Safety Data Sheet** (SDS) for greater details on transportation, storage, handling and other security guidelines.

Environmental Impact: The regulated volatile organic content is 9.5% (134 g/L) by EPA and WHMIS standards.



This product meets the European Directive 2011/65/EU Annex II (ROHS); recasting 2002/95/EC.

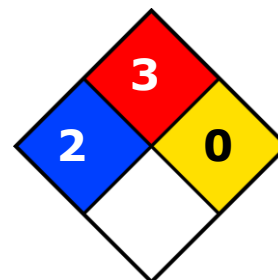
Health and Safety: The solvents in 842 can ignite if exposed to flames or sparks and can cause respiratory track irritation. If ignited, then flame flash back is possible. Use in well-ventilated area.

Solvents can cause skin irritation and have some reproductive effects. Wear safety glasses or goggles and disposable gloves to avoid exposures.

HMIS® RATING

HEALTH:	* 2
FLAMMABILITY:	3
PHYSICAL HAZARD:	0
PERSONAL PROTECTION:	

NFPA® 704 CODES



Approximate HMIS and NFPA Risk Ratings Legend:

0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

Aerosol Application Instructions

For best results, apply thin wet coats as opposed to using thick coats. We recommend a final dry film thickness of at least 1.0 mil [25 µm]. Follow the procedure below for ensure optimal conductivity.

Prerequisites

Clean and dry the surface of the substrate to remove

- Oil, dust, water, solvents, and other contaminants

Material & Equipment

- Personal protection equipment (See 842-Aerosol SDS)

To apply the coating

1. Shake the can vigorously for 2 minutes, and swirl the bead around the bottom to lift settled material back in solution.
2. Spray a test pattern. This step ensures good flow quality and helps establish appropriate distance to avoid runs.
3. At a distance of 20 to 25 cm (8 to 10 inches), spray a thin and even coat onto a vertical surface. For best results, use spray-and-release strokes with an even motion to avoid excess paint in one spot. Start and end each stroke off the surface.
4. Before the next coat, rotate the surface 90° or change stroke direction (horizontal or vertical) to ensure good coverage.
5. Wait 1 minute, shake can, and spray another coat. The delay avoids trapping solvent between coats.
6. Apply additional coats until desired thickness is achieved. (Go to Step 3)
7. Let dry for 7 minutes (flash off time) at room temperature.

NOTE: Swirling the aerosol can slightly while waiting prevents settling.

ATTENTION!

- Holding the can with at a non-vertical angle during the spray application may result in uneven application.
- Coats that are applied too thick cause runs and hamper solvent evaporation.
- Spraying onto horizontal surfaces is not recommended.

After use, clear the nozzle of the aerosol

1. Invert the aerosol can upside down.
2. Press button until clear propellant comes out. The propellant should become clear in a few seconds.

ATTENTION! Failure to clear nozzle can lead to valve being blocked open or closed in a non-noticeable way.

- If blocked closed, the can will not be usable.
- If blocked slightly open, the contents can spill out overnight creating a mess.

To cure at Room temperature

- Let air dry 24 hours

To accelerate cure by heat

- After flash off, put in oven or under heat lamp at ≤ 65 °C for 30 min.

NOTE: Coats that are very thick require more time to dry. Heat curing ensures optimal performance.

ATTENTION! If heat curing, do not exceed 65 °C as this may cause surface defects due to solvents evaporating off too quickly.



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Packaging and Supporting Products

<i>Cat. No.</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Packaging Weight</i>	
842-140G	Aerosol	85 mL	2.87 fl oz	140 g	4.93 lb	2.28 kg ^{a)}	5.03 lb ^{a)}
842-340G	Aerosol	208 mL	7.03 fl oz	340 g	11.9 oz	2.8 kg ^{b)}	6.17 lb ^{b)}

a) Case pack of 10

b) Case pack of 6

Conductive Coating Removers

- *Thinner*: Cat. No. 435-1L, 435-4L

Technical Support

Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions, and FAQs are located at www.mgchemicals.com.

Email: support@mgchemicals.com

Phone: +(1) 800-340-0772 (Canada, Mexico & USA)

+ (1) 905-331-1396 (International)

Fax: +(1) 905-331-2862 or +(1) 800-340-0773

Mailing address: **Manufacturing & Support**
1210 Corporate Drive
Burlington, Ontario, Canada
L7L 5R6

Head Office
9347-193rd Street
Surrey, British Columbia, Canada
V4N 4E7

Warranty

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