

## Description

The 841 *Super Shield Nickel Conductive Coating* is a conductive acrylic paint designed to reduce electromagnetic or radio frequency interference (EMI/RFI)—an issue for all electronic devices. Long-term protection from EMI/RFI is assured by its oxidation resistant flakes and durable acrylic binder.

The acrylic binder minimizes loss of metallization through rubbing, and paint peeling. The 841 coating is UL approved for adhesion to ABS and polycarbonates at both hot and cold temperatures.

The high oxidation resistance of the high-purity nickel flakes ensures a long-term conductivity that will not degrade quickly over time, making it suitable for marine and other harsh environments. In cases of degradation, the coating is removable or repairable to re-establish the desired shielding performance.

## Applications & Usages

The 841 paint is well suited for coating the interior of plastic electronic enclosures and offers a simple way to deal with EMI/RFI issues, allowing devices to pass FCC emission testing. Its primary applications are in cell phones, PDA's, other consumer electronics, telecommunication equipment, industrial equipment, medical devices, military devices, and aerospace equipment. Furthermore, it can be used to shield entire rooms that will be over-coated with a decorative acrylic paint. Other applications include providing electric continuity for circuits and protecting conductive metal surfaces prone to oxidation.

## Benefits and Features

- **UL Recognized** (File # [E202609](#))
- **Tested in compliance with IEEE Std. 299-1997**
- **High Conductivity—0.0042 Ω·cm; 0.6 Ω/sq for one coat**
- **Repairable and removable thermoplastic paint system**
- **Tough and durable coat, salt spray tested with excellent weatherability**
- **Stronger adhesion than water based coatings**
- **Median attenuation 50 dB ±25 dB** per 38 μm (~1.5 mil) for frequency range of 10 to 18,000 MHz

### ENVIRONMENT

RoHS Compliant  
Low-VOC



## Curing & Work Schedule

<i>Properties</i>	<i>Value</i>
Dry to Touch (liquid) <sup>a)</sup>	3 to 5 min
Recoat time (liquid) <sup>a)</sup>	2 min
Full Cure (at room temp.)	24 h
Full Cure (at 65 °C)	30 min
Shelf Life	3 y
Storage Temperature Limits	-5 to +40 °C [+23 to +104°F]

a) Assumes let 1:1 let down with MG 435 or 4351 Thinner Cleaner Solvent

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

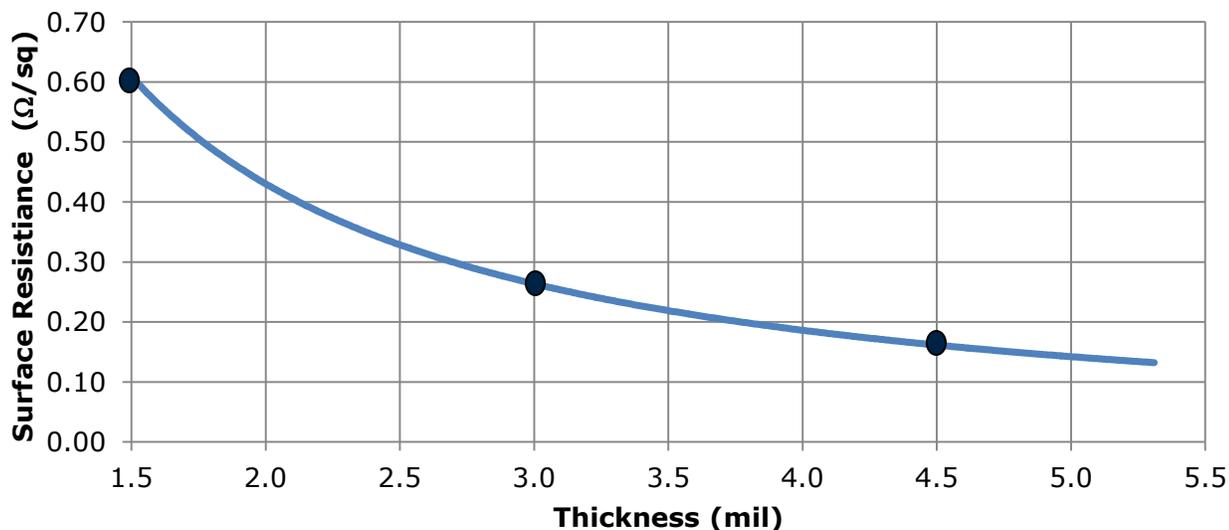
## Service Ranges

<i>Properties</i>	<i>Value</i>
Service Temperature	-40 to +120 °C [-40 to +248 °F]
Maximum Coverage per Liter <sup>c)</sup>	<82 000 cm <sup>2</sup> [<88 ft <sup>2</sup> ]
Maximum Coverage per U.S. Gallon <sup>c)</sup>	<311 000 cm <sup>2</sup> [<335 ft <sup>2</sup> ]

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



## Surface Resistance by Coating Thickness



**Figure 1.** Nickel conductive coating surface resistance at different thicknesses (the dots indicate typical successive coat thicknesses)

## Properties of Uncured 841

<i>Physical Property</i>	<i>Mixture</i>
Color	Light Steel Grey
Viscosity at 25 °C [77 °F] <sup>a)</sup>	3920 cP [3.92 Pa·s]
Density	1.69 g/mL
Solids Percentage (wt/wt) <sup>b)</sup>	~65%
Flash Point <sup>b)</sup>	-18 °C [-0.4 °F]
Odor	Ethereal

a) Brookfield viscometer at 30 RPM with spindle LV4

b) Based on flash point acetone



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

# Super Shield™ Nickel Conductive Coating 841 Technical Data Sheet

841-Liquid

## Compatibility

**Chemical**—Nickel has good resistance to oxidation in a variety of corrosive environments, including marine environments. In normal atmosphere or freshwater, nickel typically corrodes less than 0.0025 mm per year. Since nickel forms a passive protective film on its surface that slows down or stops further corrosion, the passive nickel resists corrosion better than pure copper fillers. In addition, nickel is harder than its silver or copper filled counterparts, helping provide greater durability.

The thermoplastic acrylic resin is incompatible common paint solvents like toluene, xylene, acetone, and MEK. Further, it will not withstand chronic exposures to engine oils, fuels and other similar hydrocarbons. While this makes the coating unsuitable for solvent rich environments, it does offers great repair and rework characteristics.

**Adhesion**—The 841 coating adheres to ABS, PBT, and most materials found on 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.

## 841 Adherence Compatibility

<i>Substrate</i>	<i>Note</i>
Acrylonitrile Butadiene Styrene (ABS)	UL tested substrate, superior adhesion <sup>a)</sup>
Polybutylene Terephthalate (PBT)	UL tested substrate, superior adhesion <sup>a)</sup>
Acrylics or Acrylic Paints	Adheres well to clean surface <sup>a)</sup>
Polycarbonate	Adheres well to clean surface <sup>a)</sup>
Polyvinyl Acetate (PVA)	Adheres well to clean surface <sup>a)</sup>
Polyurethane	Adheres well to clean surface for most urethane types
Wood	Adheres well with surface preparation

a) Adhesion is improved through chemical etchants. Etchants normally removes the need for extra surface preparation steps. Etchant have similar effect to sanding, except that it not only roughens but it also softens the surface helping the paint meld directly into the plastic for superior adhesion.

**ATTENTION!** Use with care on thin plastics or on plastics where you want to keep original surface intact. The 841 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.

For chemically sensitive substrates, use the 4351-1L thinner lessens the etching effects.

## Storage

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

## Health, Safety, and Environmental Awareness

Please see the 841 **Material Safety Data Sheet** (MSDS) for greater details on transportation, storage, handling and other security guidelines.

**Environmental Impact:** The volatile organic content (VOC) is 27.5% (453 g/L) by EPA and WHMIS standards. After dilution with 435 Thinner Cleaner, the regulated VOC drops to 19% (~310 g/L).



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

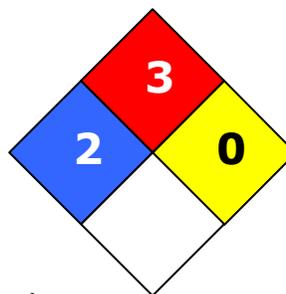
**Health and Safety:** The solvents in 841 can ignite if exposed to flames or sparks and can cause respiratory track irritation. Use in well-ventilated area.

Solvents and Nickel can cause skin irritation or allergies. Wear safety glasses or goggles and disposable gloves to avoid exposures. Do not ingest.

### HMIS® RATING

<b>HEALTH:</b>	<b>2</b>
<b>FLAMMABILITY:</b>	<b>3</b>
<b>PHYSICAL HAZARD:</b>	<b>0</b>
<b>PERSONAL PROTECTION:</b>	

### NFPA® 704 CODES



*Approximate HMIS and NFPA Risk Ratings Legend:*

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

## Application Instructions

The 841 Super Shield can be easily applied by the paintbrush, spray gun, or dip method.

**NOTE:** In all cases, the mixture should be kept slightly agitated during use to avoid premature settling of the solids.

For best results, apply many thin coats as opposed to using fewer thick coats. We recommend a coat with a dry film thickness of roughly 1.5 mil [33 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
- Mixing spatula
- Clean paint brush **OR** HPLV spray gun **OR** dip tank system
- Thinner/Cleaner solvent
- Personal protection equipment (See 841-Liquid MSDS)



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## Spray Gun Application Instructions

Read the procedure below fully and make necessary adjustments to get the required coat thickness for your needs. Typically, one coat results in a dry film thickness of roughly 1 to 1.5 mil [25 to 38 µm].

### Spray Equipment

Use a HVLP (high-volume low pressure) spray gun using the initial settings described in the following table. Adjust these settings and recommendations as required.

### Initial Setting Recommendations

<b>Air Cap</b>	#3 HVLP		
<b>Pressure</b>	<i>Inlet</i> 23 PSI	<i>Air Flow</i> <sup>b)</sup> 13.5 SCFM	<i>Air Cap</i> 10 PSI
<b>Fluid Tip</b>	1.3 mm	(1.5 mm) <sup>a)</sup>	

*Note:* These recommendations are based on a DeVilbiss FinishLine paint gun, and may differ with other brands. Please consult your spray gun manufacturer's guide.

a) If no or reduced let down is performed, this may be a better tip choice.

b) SCFM = standard cubic foot per minute

### To apply the required thickness by weight

- Mix paint thoroughly with a spatula or with mechanized paint mixer.
- Let down the paint with at a **1:1** (Paint:Thinner) ratio.
- Spray a test pattern. This step ensures good flow quality and helps establish appropriate distance to avoid runs.
- At a distance of 23 to 30 cm (9 to 12 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.
- Wait 2 to 3 minutes and spray another coat. The delay avoids trapping solvent between coats.
- Apply additional coats until desired thickness is achieved. (Go to Step 3)
- Let dry for 5 minutes (flash off time) at room temperature.

**NOTE:** Swirling the paint gun container slightly while waiting prevents settling.

### ATTENTION!

- Coats that are applied too thick cause runs and hampers solvent evaporation. Prefer the application of many mist coats rather than fewer thicker wet coats.
- Spraying onto horizontal surfaces is not recommended due to possible uneven settling of metallic filler.

### 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.



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**NOTE:** Coats that are very thick require more time to dry.

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

## Packaging and Supporting Products

<i>Cat. No.</i>	<i>Form</i>	<i>Net Volume</i>	<i>Net Weight</i>	<i>Shipping Weight</i>
<b>841-340G</b>	aerosol	0.375 L 12 fl oz	0.21 kg 0.47 lb	0.3 kg <sup>a</sup> 0.6 lb <sup>a</sup>
<b>841-900ML</b>	Liquid	0.9 L 0.24 gal	1.6 kg 3.6 lb	1.9 kg 4.2 lb
<b>841-1G</b>	Liquid	3.8 L 1.0 gal	6 kg 13.7 lb	7 kg 15 lb

a) pack of 6 cans

### Supporting Products

- Thinner/Cleaner 435-1L (*for quick cure and most normal substrates*)
- Thinner/Cleaner 4351-1L (*for slow cure and sensitive plastics substrates*)

## 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](http://www.mgchemicals.com).

Email: [support@mgchemicals.com](mailto:support@mgchemicals.com)

Phone: 1-800-340-0772 Ext. 30 (Canada, Mexico & USA)

1-905-331-1396 Ext. 30 (International)

Fax: 1-905-331-2862 or 1-800-340-0773

Mailing address: **Manufacturing & Support**  
1210 Corporate Drive  
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L7L 5R6

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

## Warranty

*M.G. Chemicals Ltd.* warranties this product for 12 months from the date of purchase by the end user. *M.G. Chemicals Ltd.* makes no claims as to shelf life of this product for the warranty. The liability of *M.G. Chemicals Ltd.* whether based on its warranty, contracts, or otherwise shall in no case include incidental or consequential damage.

## Disclaimer

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