Silver Conductive Coating

Description

842UR is a one-part, heat-cured, silver polyurethane coating. It is a smooth, flexible, abrasion resistant coating that provides excellent electrical conductivity and high frequency shielding at a low film thickness. It maintains flexibility at low temperatures, provides exceptional adhesion to a wide variety of substrates, and provides excellent environmental stability.

842UR is designed for large volume board-level or package-level EMI/RFI shielding applications. It can replace traditional metal cap, which reduces cost, board thickness, and mass.

Features and Benefits

- *Surface resistance of 0.02 Ω/sq at 7.5 µm*
- *Resistivity of 1.5 x 10^{-4} Ω·cm*
- *Excellent toughness and adhesion*
- *Withstands wave solder temperatures*
- *Designed for robotic spray applications*

Usage Parameters

Properties	Value
Dry/recoat time	20 min
Shelf life	2 y
Full cure @22 °C [72 °F]	Heat cure only
Full cure @125 °C [257 °F]	30 min
Full cure @140 °C [284 °F]	15 min
Theoretical HLVP spray coverage per litre [a)]	≤9 300 cm^2 [≤10 ft^2]

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

Temperature Ranges

Properties	Value
Constant service temperature	-40–125 °C [-40–257 °F]
Storage temperature	25–40 °C [77–104 °F]

Cured Properties

Electrical Properties	Method	Value
Resistivity	Method 5011.5 in MIL-STD-883H	1.5 x 10^{-4} Ω·cm
Volume conductivity	Method 5011.5 in MIL-STD-883H	6.6 x 10^{3} S/cm
Surface resistance [a)]		Resistance / Conductance
1 coat @0.3 mil	Square probe	0.02 Ω/sq / 50 S
2 coats @0.8 mil	Square probe	0.01 Ω/sq / 100 S
3 coats @2.0 mil	Square probe	<0.01 Ω/sq / >100 S

NOTE: Specifications are for samples cured at 125 °C for 30 min and conditioned at ambient temperature and humidity.
a) Surface resistance is given in Ω/sq and the corresponding conductance in Siemens (S or Ω^{-}). Readings less than 0.01 Ω/sq are below the detection limit of the hand-held multimeter and square probe method.

Surface Resistance by Coating Thickness

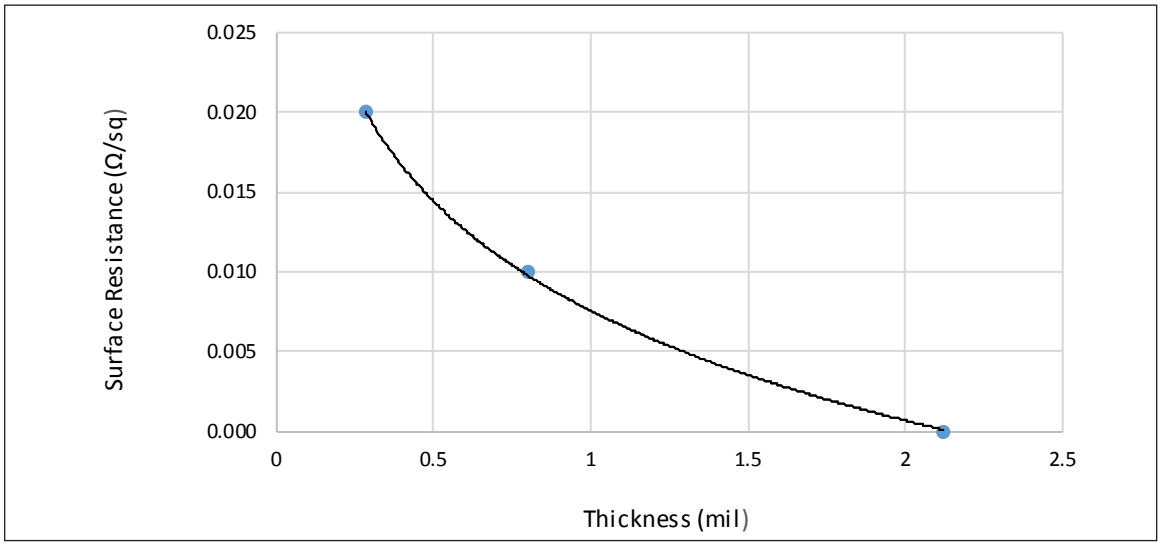

Figure 1. 842UR resistance at different thicknesses (the points indicate typical successive coat thicknesses).

Cured Properties

Mechanical Properties	Method	Value
Adhesion (PC) (Polyamide) (Glass) (Copper) (Aluminum) (FR4)	ASTM D3359 ASTM D3359 ASTM D3359 ASTM D3359 ASTM D3359 ASTM D3359	5B 4B 5B 5B 5B 5B
Pencil hardness (ABS)	ASTM D3363	2H, hard

NOTE: Specifications are for samples cured at 125 °C for 30 min and conditioned at ambient temperature and humidity.

Uncured Properties

Physical Properties	Method	Value
Color	Visual	Silver
Viscosity @25 °C [77 °F]	Brookfield Viscometer	4 cP [3.0 mm^2/s] a)
Density	ASTM D 1475	1.33 g/mL
Odor	—	Sweet, fruity
Solids content	—	30%

a) Brookfield viscometer at 100 rpm with spindle LV S61.

Compatibility

Chemical Resistance—The silver filler is 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 due to oxidation is not as bad.

Adhesion—The coating adheres to most plastics and metals used to house printed circuit assemblies; however, it is not compatible with contaminants like water, oil, or greasy flux residues that may affect adhesion. If contamination is present, first clean the surface to be coated with MG Chemicals 824 Isopropyl alcohol.

For substrates with weak adhesion strength, surface preparation (such as sanding, or pre-coating with a suitable primer) may improve adhesion.

Storage

Store between 25 and 40 °C [77 and 104 °F] in a dry area, away from sunlight.

Health and Safety

Please see the 842UR Safety Data Sheet (SDS) for further details on transportation, storage, handling, safety guidelines, and regulatory compliance.

Application Instructions

For best results, follow the procedure below.

Spray Equipment

The spray gun recommendations below are based on generic paint guns and may vary by brands. Consult your spray gun manufacturer's guide.

Initial Setting Recommendations

Air Cap	HVLP (high volume, low pressure) or LVMP (low volume, medium pressure)		
Pressure	Inlet: 23 psi	Air flow: 13.5 SCFM [a)]	Air cap: 10-15 psi
Fluid Tip	0.8–1.3 mm		

a) Standard cubic foot per minute

Spraying:

1. Mix coating thoroughly with a spatula or mechanized paint mixer.
2. Spray a test pattern to ensure good flow quality.
3. At an approximate distance of 20–25 cm (8–10 in), tilt the board 45° from a vertical position and spray a thin and even coat. 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. Wait 20 min before applying another coat to avoid trapping solvent.
5. Rotate the board 90° and spray again to ensure good coverage.
6. Apply other coats until desired thickness is achieved (go to step 3).
7. Let dry for 20 min at room temperature before heat cure.

Brushing:

1. Mix coating thoroughly with a spatula or mechanized paint mixer.
2. Use a foam or roller brush to coat the board. Use long, smooth strokes to create an even coat.

Selective coating:

Custom blended solutions are available and have been verified for use with selective coating machines using both non-atomised and film coating applicators. To inquire about a custom solution tailored to your equipment, contact MG Chemicals' Technical Support for assistance.

Cure Instructions

Room temperature cure:

Do NOT cure at room temperature. This product will only cure at elevated temperatures.

Heat cure:

- Put in oven at 125 °C [257 °F] for 30 min.
  —OR—
- Put in oven at 140 °C [284 °F] for 15 min.

Packaging and Supporting Products

Cat. No.	Packaging	Net Volume	Net Weight
842UR-12ML	Jar	12 mL [0.40 fl oz]	16.0 g [0.56 oz]
842UR-150ML	Can	150 mL [5.07 fl oz]	200 g [7.05 oz]
842UR-850ML	Can	850 mL [1.79 pt]	1.13 kg [2.49 lb]
842UR-3.6L	Can	3.60 L [3.80 qt]	4.80 kg [10.5 lb]

Technical Support

Please contact us regarding any questions, suggestions for improvements, 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)
+(44) 1663 362888 (UK & Europe)
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

Disclaimer

This information is believed to be accurate. It is intended for professional end users who have the skills required to evaluate and use the data properly. M.G. Chemicals Ltd. does not guarantee the accuracy of the data and assumes no liability in connection with damages incurred while using it.