

Applications

- EMI / RFI Shielding
- Galvanic corrosion resistance
- ESD Protection
- Grounding
- Electroplating plastics

Industries

- Aerospace
- Communications
- Consumer Electronics
- Defence
- Electric Vehicles
- Instrumentation
- Medical equipment
- Research

Conductive Acrylic Paint - These 1-part coatings cure quickly and are most commonly used to provide EMI/RFI shielding to plastic electronic enclosures.

Conductive Epoxy Paint - These 2-part coatings offer superior adhesion, durability, and chemicals resistance. They are suitable for use in harsh environments.

Water Based Conductive Shielding Paint

- These 1-part coatings are non-flammable, low VOC, and low odor. They are suitable for architectural applications, electronic enclosures, and musical instrument.

Packaging and Board Level Shielding -

These coatings are suitable for high frequency EMI board and package level applications.

ESD Safe Coating - These are durable coatings that eliminate electrostatic discharge on a wide variety of substrates.

Conductive Paints



Binder Systems

Acrylic is the most used binder for plastic enclosures. It cures at room temperature, applies easily, and creates a durable coating.

Water based urethane is the only choice for architectural applications because of its low VOC content. It is non-flammable, has no noxious vapors, and is not a dangerous good when shipped by air.

Solvent based urethane creates a flexible coating and applies very thin. It adheres strongly to most substrates including plastics, metals, and glass.

Epoxy is used when extreme durability and strong chemical resistance is needed. It offers mar and scratch resistance, very strong adhesion, extreme abrasion and impact resistance. Epoxy-based paints are the best choice for coating metals and concrete.

Conductive Fillers

Carbon is best for low frequency shielding, musical instruments, and grounding.

Nickel is suitable for most device-level shielding applications. It provides modest shielding, durability, and excellent corrosion resistance.

Silver offers the best shielding and corrosion resistance. It is also the best choice for board-level and package level shielding. It can be applied very thin.

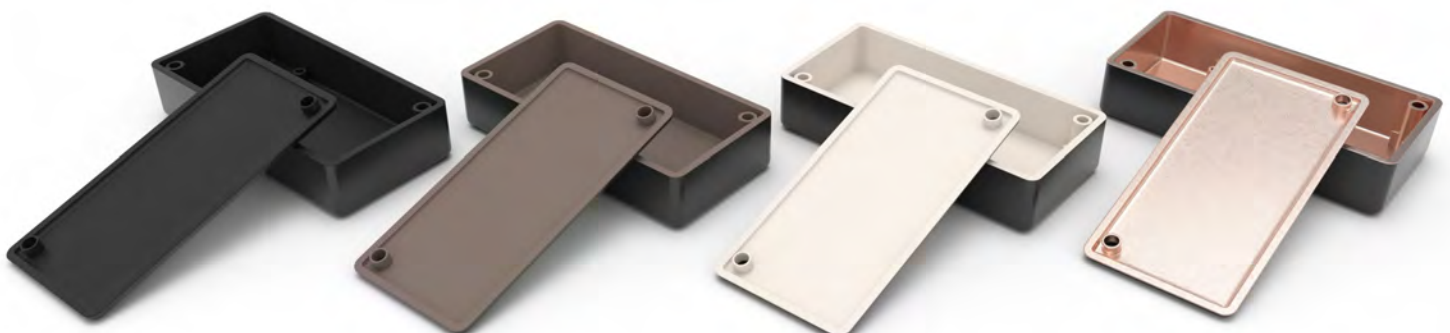
Silver-coated copper provides superior shielding performance at a lower cost compared to silver.

EMI/RFI SHIELDING PAINTS

	Carbon	Nickel	Silver	Silver-coated Copper
Solvent based Acrylic	838AR	841AR	842AR	843AR
Water based Urethane	—	841WB	842WB	843WB
Solvent based Urethane	—	—	842UR	—
Solvent based Epoxy	—	841ER	842ER	843ER

ESD COATINGS

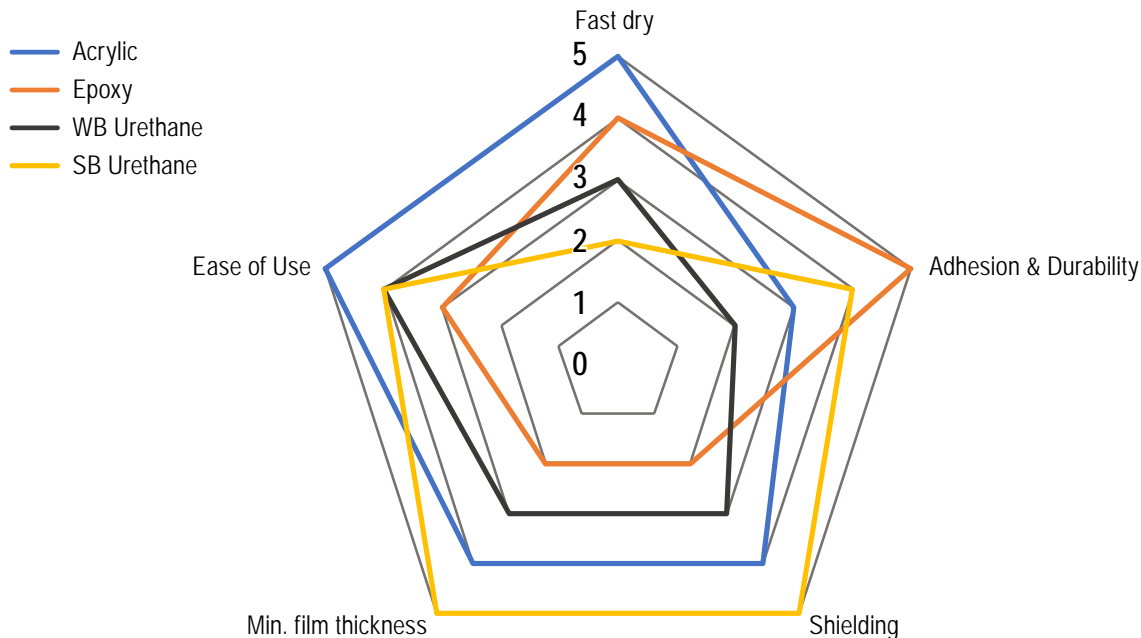
844AR
844WB
—
—



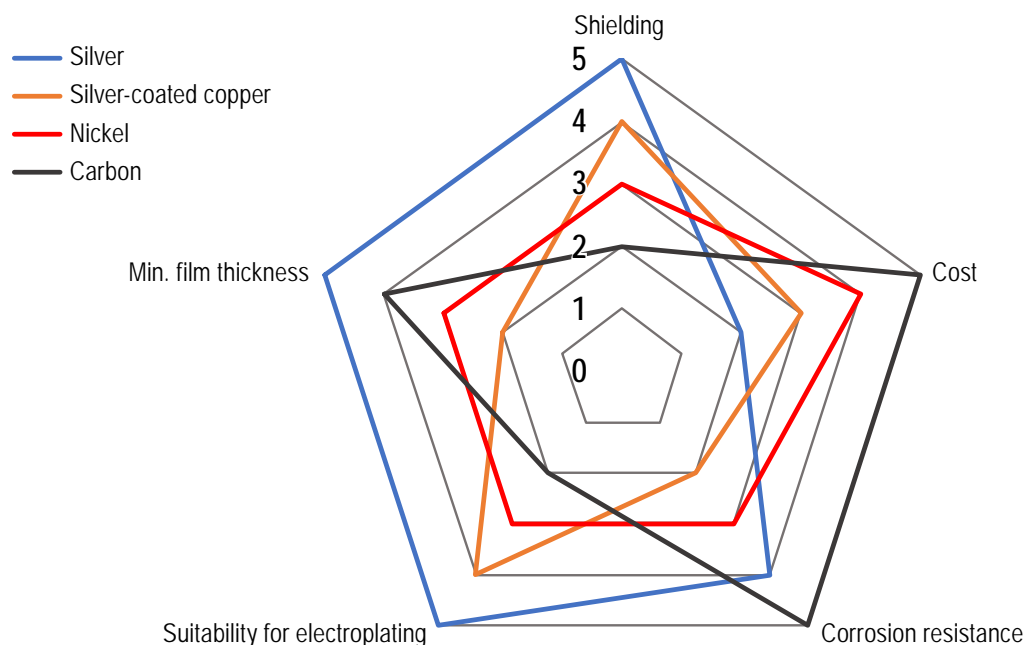
Conductive Paints



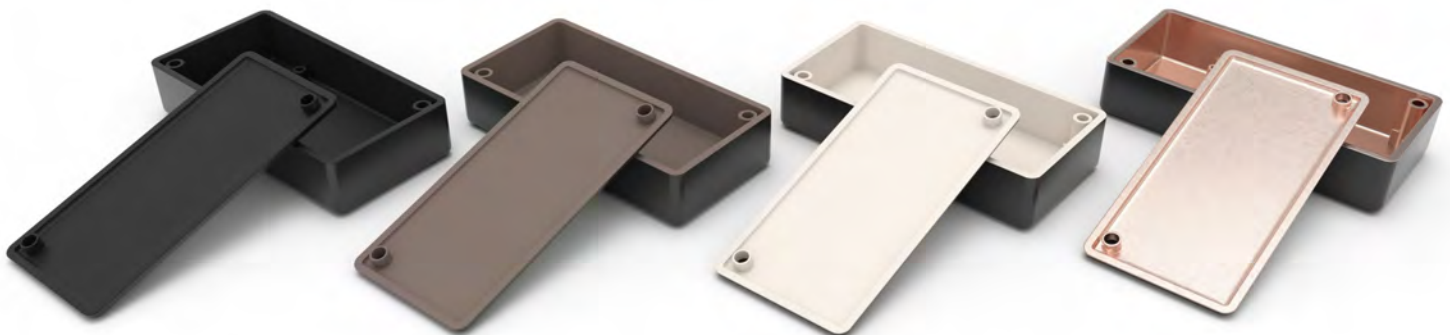
The general properties of conductive paints vary by their binder system and conductive fillers. Therefore, it is important to choose the right combination your specific application. The below graphs qualitatively compare the performance of conductive paints based on their binder and conductive filler systems.



Graph 1. Performance comparison of conductive paints based on the binder type. 5 represents the highest performance and 1 represents the lowest performance.



Graph 2. Performance comparison of conductive paints based the filler type. 5 represents the highest performance and 1 represents the lowest performance.



Protection against EMI/RFI

MG Chemicals AR series are acrylic-based conductive paints that are designed for protection against EMI/RFI across a broad frequency spectrum. These easy-to-use 1-part coatings cure quickly and are intended for use on commonly used plastics for PCB enclosures like ABS, Nylon and Polycarbonate.

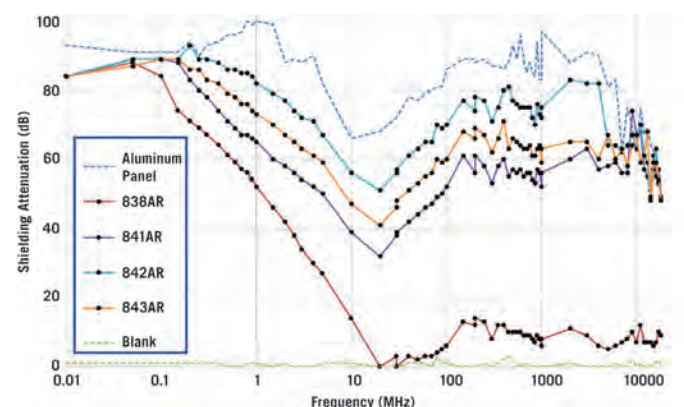
Features & Benefits

- 1-part systems, easy to apply
- 5 options available depending on conductivity requirements
- Strong corrosion resistance
- Excellent adhesion to most plastics
- Does not contain toluene, xylene, or MEK
- Broad frequency range protection

Applications

- Shielding plastic PCB enclosures
- Board-level shielding
- Conductive coating for electro-plating
- Shielding long-range communication devices and satellites

- 838AR • Carbon conductive paint for low frequency shielding and electrical grounding
- 841AR • Nickel conductive paint for broad spectrum shielding
- 842AR • Silver conductive paint for premium EMI vprotection
- 842ARL • Silver conductive paint with low film thickness
- 843AR • Silver-coated copper conductive paint which balances cost and EMI performance



Acrylic Conductive Paints



	838AR	841AR	843AR	842AR	842ARL
Certification	—	UL (File # E202609)	UL (File # E202609)	—	—
UNCURED PROPERTIES					
Conductive filler	Carbon	Nickel	Silver-coated Copper	Silver	Silver
Format	Liquid	Liquid	Liquid	Liquid	Liquid
Color	Black	Dark grey	Light metallic brown	Light grey	Light grey
Percent solids	15%	57%	31%	61%	39%
Density @ 25 °C	0.9 g/mL	1.7 g/mL	1.1 g/mL	1.7 g/mL	1.3 g/mL
Viscosity @ 25 °C	114 cP	1 460 cP	<30 cP	873 cP	16 cP
Calculated VOC	519 g/L	236 g/L	187 g/L	206 g/L	268 g/L
Dilution required for spray	Yes	Yes	No	Yes	Yes
Theoretical coverage @ 2 mil (based on 100% transfer efficiency)	20 016 cm ² /L	44 785 cm ² /L	23 290 cm ² /L	46 000 cm ² /L	21 000 cm ² /L
Recoat time	3 min	3 min	3 min	3 min	3 min
Cure time @ 22 °C	24 h	24 h	24 h	24 h	24 h
Cure time @ 65 °C	30 min	30 min	30 min	30 min	30 min

CURED PROPERTIES

Resistivity	0.63 Ω·cm	0.0040 Ω·cm	0.00030 Ω·cm	0.00010 Ω·cm	0.000075 Ω·cm
Surface resistance @ 50 µm	100 Ω/sq	0.49 Ω/sq	0.080 Ω/sq	0.015 Ω/sq	—
Salt fog resistance @ 35 °C, 96 h	Excellent	Excellent	Poor	Excellent	—
Constant service temperature	-40–120 °C	-40–120 °C	-40–120 °C	-40–120 °C	-40–120 °C
Adhesion (ABS/PC)	5B	5B	5B	5B	5B
Pencil hardness	H, hard	3H, hard	F, medium	3H, hard	F, hard
Magnetic class	Diamagnetic	Ferromagnetic	Diamagnetic	Diamagnetic	Diamagnetic

AVAILABLE PACKAGING

Net content	12 mL (glass jar)	12 mL (glass jar)	—	12 mL (glass jar)	850 mL (metal can)
	—	150 mL (metal can)	—	150 mL (metal can)	—
	850 mL (metal can)	850 mL (metal can)	850 mL (metal can)	850 mL (metal can)	—
	3.60 L (metal can)	3.60 L (metal can)	3.60 L (metal can)	3.60 L (metal can)	—



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Protection Against EMI/RFI: Durable and Chemically Resistant

MG Chemicals ER series are epoxy conductive paints that are designed for protection against EMI/RFI. They offer superior durability and resistance to solvents compared to other chemistries. These 2-part systems are suitable either in harsh environments with direct chemical exposure or for use on substrates like metal and concrete.

Features & Benefits

- 2-part systems
- Superior adhesion to metals and concrete
- Excellent abrasion resistance
- Enhanced resistance against solvents
- Withstands wave solder temperatures exceeding 260°C

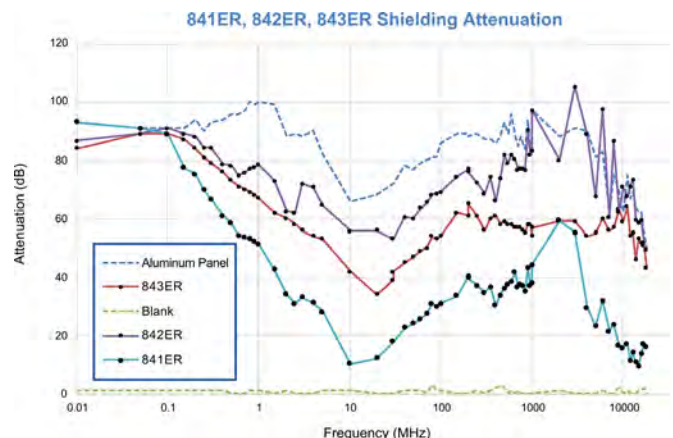
Applications

- Military and commercial electronic enclosures
- Avionic systems
- Shielding paint for flooring
- Conductive coating for electroplating metals
- Shielding in harsh environments like engine hoods

841ER - Nickel conductive paint for electroplating metals

842ER - Silver conductive paint for premium shielding performance

843ER - Silver-coated copper conductive paint which balances cost and EMI performance



Epoxy Conductive Paints



UNCURED PROPERTIES

Conductive filler
Format
Color
Mix ratio by weight
Mix ratio by volume
Percent solids
Density @ 25 °C [77 °F]
Viscosity @ 25 °C [77 °F]

Calculated VOC
Theoretical coverage @ 2 mil
(based on 100% transfer efficiency)
Working time
Recoat time (Plastic)
Cure time @ 22 °C [71.6 °F]
Cure time @ 65 °C [149 °F]
Cure time @ 80 °C [176 °F]
Cure time @ 100 °C [212 °F]

841ER

Nickel
Liquid
Grey
100:25
100:38
32%
1.81 g/mL
200 cP (Part A)
18 cP (Part B)
1 294 g/L
28 000 cm²/L
4 h
5 min
Heat cure only
4 h
2 h
1 h

842ER

Silver
Liquid
Metallic silver
100:10
100:20
54%
1.37 g/mL
60 cP (Part A)
18 cP (Part B)
1 181 g/L
25 230 cm²/L
4 h
5 min
24 h
3 h
2 h
1 h

843ER

Silver-coated copper
Liquid
Light metallic brown
100:28
100:36
30%
1.00 g/mL
35 cP (Part A)
9 cP (Part B)
779 g/L
47 840 cm²/L
8 h
3 min
Heat cure only
4 h
2 h
N/A

CURED PROPERTIES

Resistivity
Surface resistance @ 50 µm
Salt fog resistance @ 35 °C [95 °F], 96 h
Constant service temperature

Adhesion (ABS/PC)
Pencil hardness
Magnetic class

0.03 Ω·cm
4.3 Ω/sq
Good
-40—150 °C
[-40—302 °F]
5B
4H, hard
Ferromagnetic

0.0002 Ω·cm
0.13 Ω/sq
Excellent
-40—150 °C
[-40—302 °F]
5B
4H, hard
Diamagnetic

0.0018 Ω·cm
0.31 Ω/sq
Poor
-40—120 °C
[-40—248 °F]
5B
6H, hard
Diamagnetic

AVAILABLE PACKAGING

Net contents

250 mL (2 metal can kit)
1.17 L (2 metal can kit)
3.25 L (2 metal can kit)

60 mL (2 glass bottle kit)
900 mL (2 metal can kit)
4.24 L (2 metal can kit)

250 mL (2 metal can kit)
810 mL (2 metal can kit)
3.25 L (2 metal can kit)



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Water Based Conductive Paint



Protection Against EMI/RFI: Low VOC/Environmentally Safe

MG Chemicals WB series are water-based conductive paints that are designed for protection against EMI/RFI. These easy-to-use, 1-part systems are intended for use in building interiors where shielding against EMI/RFI is a necessity. Compared to the AR series, WB paints enjoy the benefits of being non-flammable, low VOC and having low odor.

Features and Benefits

- 1-part system
- Ready to spray, no dilution required
- Low odor
- Excellent adhesion to drywall and most plastics
- Ships as non-DG by air
- Can be painted over with architectural paints

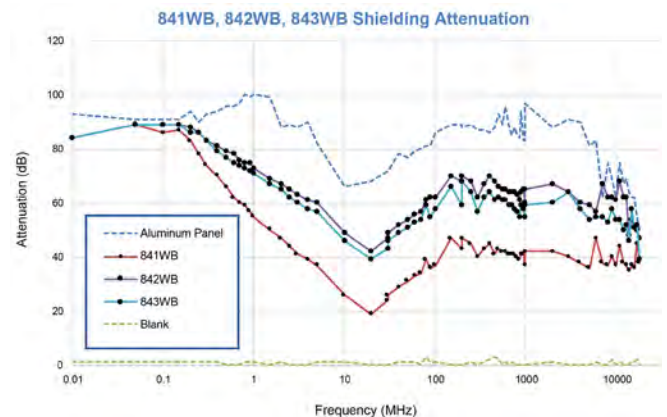
Applications

- Plastic enclosures for PCBs
- EMI shielding for operating rooms and military facilities

841WB - Nickel conductive paint for broad spectrum shielding

842WB - Silver conductive paint for premium shielding performance

843WB - Silver-coated copper conductive paint which balances cost and EMI performance



Water Based Conductive Paint



UNCURED PROPERTIES

Conductive filler
Format
Color
Percent solids
Density @ 25 °C [77 °F]
Viscosity @ 25 °C [77 °F]
Calculated VOC
Theoretical coverage @ 2 µm
(based on 100% transfer efficiency)
Recoat time (Plastic)
Recoat time (Drywall)
Cure time @ 22 °C [71.6 °F]
Cure time @ 65 °C [149 °F]

841WB

Nickel
Liquid
Grey
60%
1.81 g/mL
143 cP
28 g/L
35 800 cm²/L
30 min
7 min
24 h
3 h

842WB

Silver
Liquid
Metallic silver
60%
1.5 g/mL
195 cP
37 g/L
32 655 cm²/L
20 min
5 min
24 h
3 h

843WB

Silver-coated copper
Liquid
Light metallic brown
42%
1.32 g/mL
660 cP
37 g/L
47 040 cm²/L
20 min
5 min
24 h
2.5 h

CURED PROPERTIES

Resistivity
Surface resistance @ 50 µm
Salt fog resistance @ 35 °C [95 °F], 96 h
Constant service temperature
Adhesion (ABS/PC)
Pencil hardness
Magnetic class

0.027 Ω·cm
1.3 Ω/sq
Excellent
-40—120 °C
[-40—248 °F]
5B
HB, hard
Ferromagnetic

0.000075 Ω·cm
0.0020 Ω/sq
Excellent
-40—120 °C
[-40—248 °F]
5B
HB, hard
Diamagnetic

0.00053 Ω·cm
0.020 Ω/sq
Poor
-40—120 °C
[-40—248 °F]
5B
HB, hard
Diamagnetic

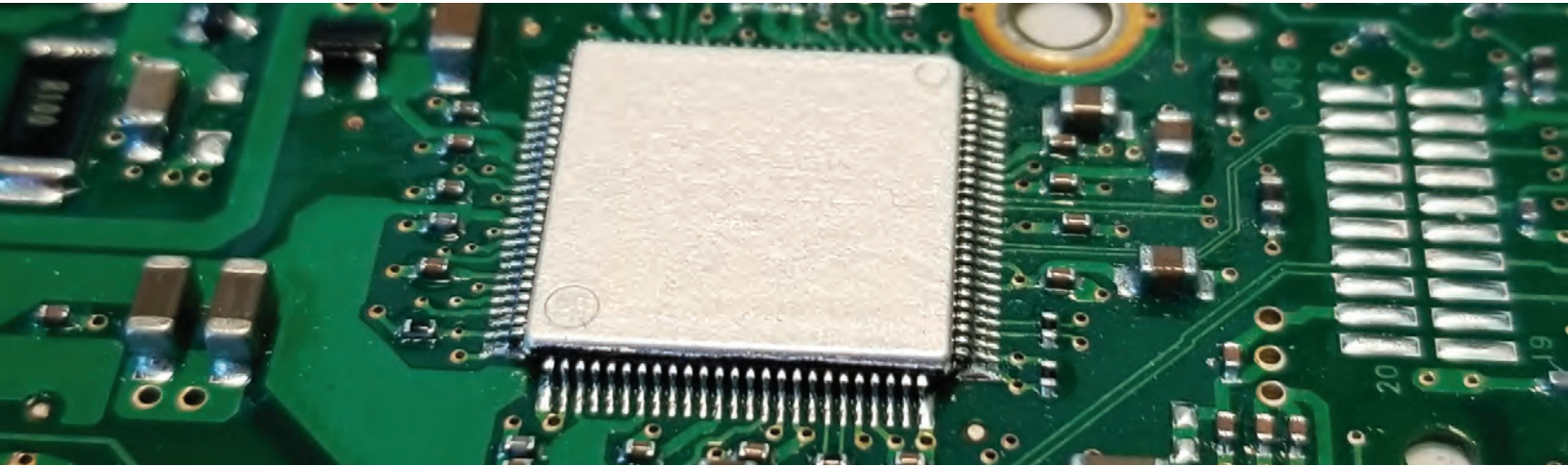
AVAILABLE PACKAGING

15 mL (glass jar)
150 mL (metal can)
900 mL (metal can)
1 gal (metal can)

15 mL (glass jar)
150 mL (metal can)
900 mL (metal can)
1 gal (metal can)

15 mL (glass jar)
150 mL (metal can)
900 mL (metal can)
1 gal (metal can)





EMI Shielding on Circuit Boards and Semiconductor Packages

MG Chemicals offers silver conductive paints for premium EMI shielding applications. These coatings are designed for large-scale, selective spray applications for both board-level shielding of circuit boards and package-level shielding for semiconductors. They are lightweight, cost-effective alternatives to processes like metal stamping and Physical Vapor Deposition (PVD)

Features & Benefits

- Cures quickly at elevated temperatures
- Excellent corrosion resistance
- Withstands wave solder temperatures exceeding 260°C (except 842AR)
- Excellent adhesion to a wide variety of substrates
- Exceptional EMI shielding
- Ready to spray

Applications

- Replacing metal stamping for board-level EMI shielding
- Replacing PVD coatings for silicon wafers
- Package-level and board-level shielding

842AR – 1-part silver acrylic conductive paint

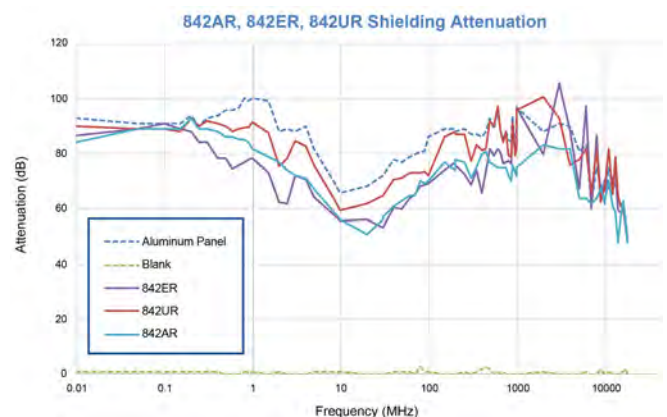
- Easy to rework
- Room temperature cure

842UR – 1-part silver polyurethane conductive paint

- Exceptional conductivity at film thicknesses as low as 7 microns
- Flexible

842ER - 2-part silver epoxy conductive paint

- Excellent solvent and abrasion resistance
- Flexible



Board Level Shielding



UNCURED PROPERTIES

	842AR	842UR	842ER
Conductive filler	Silver	Silver	Silver
Binder	Acrylic	Polyurethane	Epoxy
Format	Liquid	Liquid	Liquid
Color	Light grey	Metallic silver	Metallic silver
Mix ratio by weight	1 part	1 part	100:10
Mix ratio by volume	1 part	1 part	100:20
Percent solids	61%	30%	54%
Density @ 25 °C [77 °F]	1.70 g/mL	1.33 g/mL	1.37 g/mL
Viscosity @ 25 °C [77 °F]	873 cP	4 cP	60 cP (Part A), 22 cP (Part B)
Calculated VOC	206 g/L	360 g/L	1 181 g/L
Theoretical coverage @ 2 mil (based on 100% transfer efficiency)	46 000 cm ² /L	26 570 cm ² /L	25 230 cm ² /L
Recoat time (Plastic)	3 min	20 min	5 min
Cure time (min @ °C)	1440 @ 22 30 @ 65	30 @ 125 15 @ 140	1440 @ 22 180 @ 65 120 @ 80 60 @ 100 45 @ 120

CURED PROPERTIES

Resistivity	0.0001 Ω·cm	0.00015 Ω·cm	0.002 Ω·cm
Surface resistance @ 50 μm	0.015 Ω/sq	0.008 Ω/sq	0.13 Ω/sq
Salt fog resistance @ 35 °C [95 °F], 96 h	Excellent	Excellent	Excellent
Constant service temperature	-40—120 °C [-40—248 °F]	-40—125 °C [-40—257 °F]	-40—150 °C [-40—302 °F]
Adhesion (ABS/PC)	5B	5B	5B
Pencil hardness	3H, hard	2H, hard	4H, hard
Magnetic class	Diamagnetic	Diamagnetic	Diamagnetic

AVAILABLE PACKAGING

Net contents	12 mL (glass jar) 150 mL (metal can) 850 mL (metal can) 3.60 L (metal can)	12 mL (glass jar) 150 mL (metal can) 850 mL (metal can) 3.60 L (metal can)	60 mL (2 glass bottle kit) 900 mL (2 metal can kit) 4.25 L (2 metal can kit)
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Prevents Electrostatic Discharge on a Wide Variety of Substrates

An ESD safe coating is a conductive paint with a surface resistance in the range of 10^7 to $10^9 \Omega$. This is the “static dissipative range”, which prevents harmful buildup of static charge.

Our ESD paints adhere strongly to metals, plastics, glass, and most other surfaces.

Features & Benefits

- Dissipates electrostatic charge
- Resistance of 10^7 to $10^8 \Omega$
- Permanent coating
- Humidity independent
- Low VOC and HAP-free
- Does not contain toluene, xylene or MEK

Applications

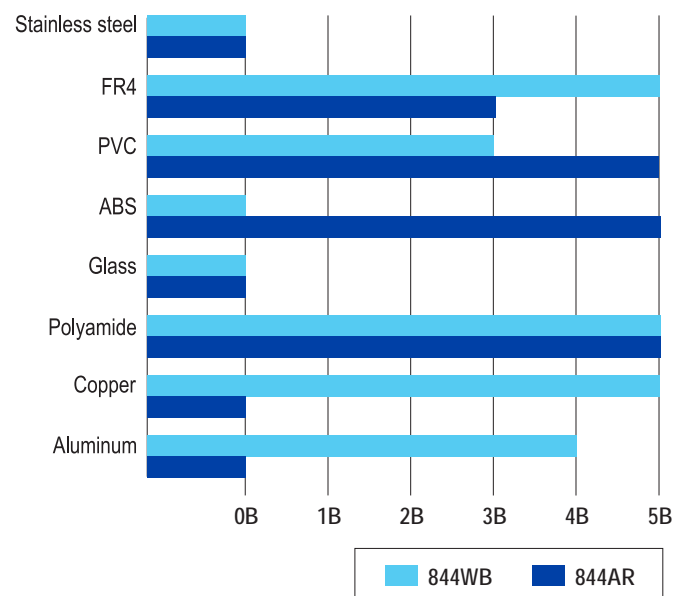
Preventing static buildup on:

- Bumpers, bins, trays, and tools
- Workstation surfaces
- Carts
- Monitors, keyboards, CPU holders
- Task chairs
- Clipboards

844AR — A one-part, dark grey, quick dry solvent-based acrylic ESD coating for plastics.

844WB — A one-part, translucent, water-based ESD paint. Non-flammable, low odor, and low VOC.

844AR vs. 844WB Adhesion



ESD Safe Coatings



UNCURED PROPERTIES

Format
Color
Percent solids
Density @ 25 °C [77 °F]
Viscosity @ 25 °C [77 °F]
Calculated VOC
Theoretical coverage @ 2 mil
Recoat time (Plastic)
Cure time @ 22 °C [71.6 °F]
Cure time @ 45 °C [113 °F]
Cure time @ 65 °C [149 °F]
Cure time @ 80 °C [176 °F]

844AR

Liquid
Dark grey
17%
0.94 g/mL
8.6 cP
423 g/L
26 800 cm²/L
5 min
24 h
N/A
30 min
N/A

844WB

Liquid
Translucent, dark tint
29%
1.03 g/mL
128 cP
71.3 g/L
36 000 cm²/L
5 min
N/A
45 min
30 min
10 min

CURED PROPERTIES

Surface resistance @ 50 µm
Constant service temperature
Pencil hardness

2.0 x 10⁸ Ω/sq
-40—120 °C [-40—248 °F]
H, hard

5.6 x 10⁷ Ω/sq
-40—120 °C [-40—248 °F]
HB, hard

AVAILABLE PACKAGING

Net contents

850 mL (metal can)
3.60 L (metal can)
—

850 mL (metal can)
3.60 L (metal can)
340 g (aerosol)



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Conductive Spray Paints



Protection against EMI/RFI

MG Chemicals Conductive Spray Paints are acrylic-based conductive paints, packaged in aerosol cans, that are designed for protection against EMI/RFI across a broad frequency spectrum. These easy-to-use 1-part coatings cure quickly and are intended for use on commonly used plastics for PCB enclosures like ABS, Nylon and Polycarbonate. This convenient packaging option allows users to complete proof-of-concept or lower volume runs quickly and economically.

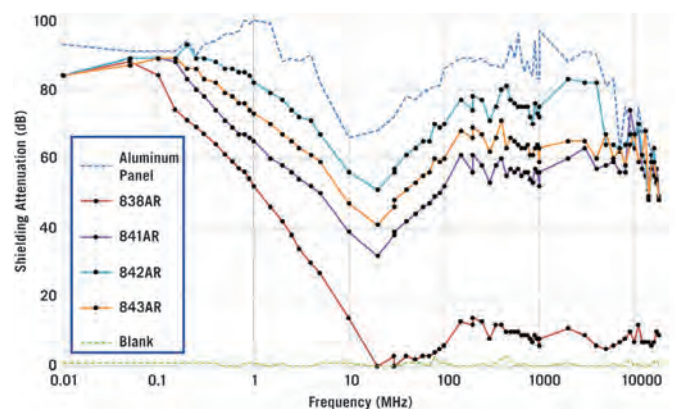
Features & Benefits

- 1-part systems, easy to apply
- 4 options available depending on conductivity requirements
- Excellent adhesion to most plastics
- Does not contain toluene, xylene, or MEK
- Broad frequency range protection

Applications

- Shielding plastic PCB enclosures
- Board-level shielding
- Conductive coating for electro-plating
- Shielding long-range communication devices and satellites

- 838AR-340G • Carbon conductive paint for low frequency shielding and electrical grounding
- 841AR-340G • Nickel conductive paint for broad spectrum shielding
- 842AR-140G • Silver conductive paint for premium EMI protection
- 843AR-340G • Silver-coated copper conductive paint which balances cost and EMI performance



Conductive Spray Paints



UNCURED PROPERTIES

	838AR-340G	841AR-340G	843AR-340G	842AR-140G
Conductive filler	Carbon	Nickel	Silver-coated copper	Silver
Format	Aerosol	Aerosol	Aerosol	Aerosol
Color	Black	Dark grey	Light metallic brown	Light grey
Percent solids	15%	57%	31%	61%
Density @ 25 °C [77 °F]	0.84 g/mL	1.34 g/mL	0.99 g/mL	1.38 g/mL
Viscosity @ 25 °C [77 °F]	46 cP	61 cP	87 cP	80 cP
Calculated VOC	587 g/L	470 g/L	404 g/L	361 g/L
Theoretical coverage @ 2 mil (based on 50% transfer efficiency)	1 500 cm ²	2 500 cm ²	3 100 cm ²	680 cm ²
Recoat time	3 min	3 min	3 min	3 min
Cure time @ 22 °C [71.6 °F]	24 h	24 h	24 h	24 h
Cure time @ 65 °C [149 °F]	30 min	30 min	30 min	30 min

CURED PROPERTIES

Resistivity	0.69 Ω·cm	0.0076 Ω·cm	0.00022 Ω·cm	0.00012 Ω·cm
Surface resistance @ 50 μm	110 Ω/sq	0.60 Ω/sq	0.080 Ω/sq	0.050 Ω/sq
Salt fog resistance @ 35 °C [95 °F], 96 h	Excellent	Excellent	Poor	Excellent
Constant service temperature	-40–120 °C [-40–248 °F]	-40–120 °C [-40–248 °F]	-40–120 °C [-40–248 °F]	-40–120 °C [-40–248 °F]
Adhesion (ABS/PC)	5B	5B	5B	5B
Pencil hardness	H, hard	3H, hard	F, medium	3H, hard
Magnetic class	Diamagnetic	Ferromagnetic	Diamagnetic	Diamagnetic

AVAILABLE PACKAGING

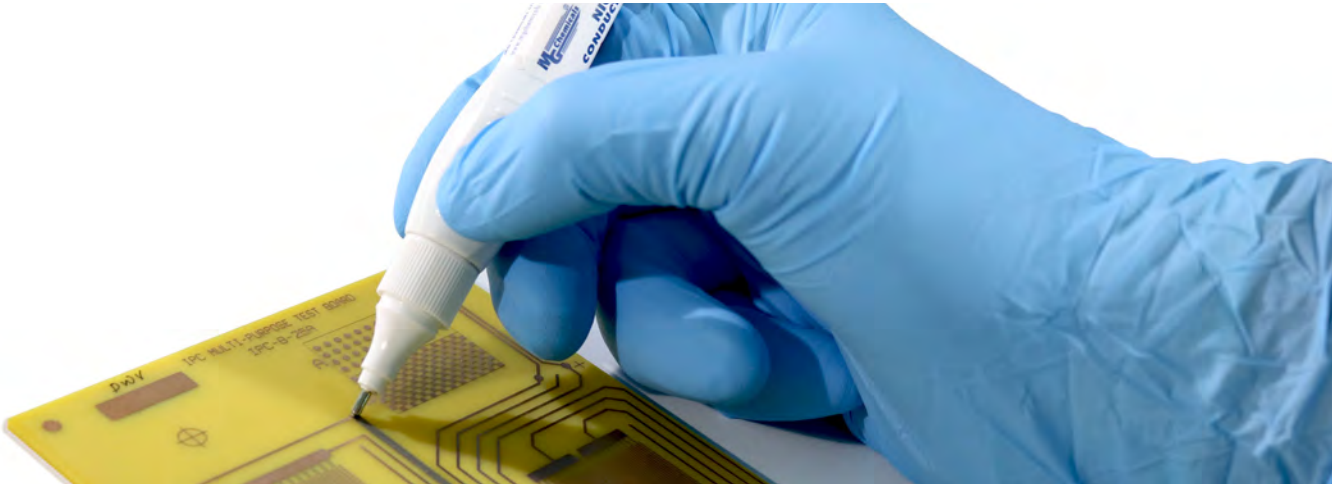
Net contents	340 g, 442 mL	340 g, 290 mL	140 g, 129 mL	340 g, 400 mL
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Easily draw and repair conductive traces

MG Chemicals offers conductive pens that allow for easy and timely repair of defective circuit traces. They dispense acrylic lacquer pigmented with either carbon powder, nickel flake, or silver flake. Each pigment provides a different resistivity, making each pen suitable for different applications.

Features and Benefits

- Create durable, corrosion resistant, conductive connections
- Tack free in minutes
- Adheres to ABS, PLA, and other 3D Printer Filaments
- Adheres to copper, aluminum, ceramics, wood, and most electronic substrates
- Typical trace width: 1.5 - 2 mm
- For use on smooth, flat, and hard surfaces
- Does not contain toluene, xylene, or MEK

Applications

- Sketch on conductive traces for prototypes
- Creating jumpers, bridges and through holes
- Repair circuits in controllers, keyboards and PCBs

838AR-P - Carbon conductive pen for low conductivity repairs like keyboards

841AR-P - Nickel conductive pen for moderate conductivity repairs like bridges and PCB trace

842AR-P/842AR-PS - Silver conductive pen for high conductivity repairs like connecting through holes



Conductive Pens



UNCURED PROPERTIES

	838AR-P	841AR-P	842AR-P
Conductive filler	Carbon	Nickel	Silver
Format	Liquid	Liquid	Liquid
Color	Black	Dark grey	Light grey
Percent solids	15%	57%	61%
Density @ 25 °C [77 °F]	0.89 g/mL	1.70 g/mL	1.70 g/mL
Viscosity @ 25 °C [77 °F]	114 cP	1 460 cP	873 cP
Calculated VOC	519 g/L	236 g/L	206 g/L
Recoat time	1 min	1 min	1 min
Cure time @ 22 °C [71.6 °F]	24 h	24 h	24 h
Cure time @ 65 °C [149 °F]	30 min	30 min	30 min
Approximate linear coverage	74 m	30 m	50 m

CURED PROPERTIES

Resistivity	0.63 Ω ·cm	0.004 Ω ·cm	0.0001 Ω ·cm
Surface resistance @ 50 μ m	100 Ω /sq	0.49 Ω /sq	0.015 Ω /sq
Constant service temperature	-40—120 °C [-40—248 °F]	-40—120 °C [-40—248 °F]	-40—120 °C [-40—248 °F]
Adhesion (ABS/PC)	5B	5B	5B
Pencil hardness	H, hard	3H, hard	3H, hard
Magnetic class	Diamagnetic	Ferromagnetic	Diamagnetic

AVAILABLE PACKAGING

Net content	5 mL, 4.44 g	5 mL, 7.57 g	2 mL, 3.65 g 5 mL, 9.14 g
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Application Guide



Acrylic Conductive Paints

This application guide outlines the equipment and recommended processes for applying MG Chemicals Acrylic Conductive Paints (AR Series). It is the user's responsibility to determine the chemical, mechanical, and thermal compatibility of the substrate prior to using any of the suggested methods.

The AR Series can be applied by paint brush, aerosol can, manual spray gun, and selective coating equipment. For large to moderate scale production runs, selective coating equipment and manual spray guns provide superior coating surfaces. The paint brush method can be used for repairs or for small scale applications, but usually do not achieve the same level of consistency and electrical conductivity as the spray methods. Dipping, while technically possible, generally requires too much effort to maintain consistent results.

Substrate Preparation

Most coating defects result from the presence of moisture, grease, oils, dirt, flux, and other board contaminants. Therefore, it is highly recommended to ensure the cleanliness and dryness of a surface prior to coating.

1. Wipe with a clean cloth, wash with soap and water, then rinse and dry.
2. Put on disposable gloves and clean with MG's 824 Isopropyl Alcohol or any other degreasing type solvent.
3. Let the surface dry fully. Elevated temperatures can accelerate drying.

To enhance adhesion, sometimes mechanical sanding or primers may be required for highly resistant plastics and non-plastics. After sanding and etching, clean the surface as per above instructions.

To save time, mask areas that should not be coated prior to spraying. While the AR series can be removed with the MG's 435 Thinner/Cleaner, masking is often more efficient. Painters tape or MG's 862 Solder Mask can be used for masking.



Mixing

The AR Series must be mixed carefully before use. If the filler is not evenly mixed, the conductivity, adhesion, and quality of the coating will vary.

Mix manually using a regular spatula, as outlined below. For larger containers, use a mechanical paint shaker or a high lift propeller mixer.

1. Use a spatula to scrape the bottom and sides to break up possible deposits.
2. Stir content until coating becomes smooth and homogeneous.
3. If lumps or deposit of material can be felt or seen, continue mixing.

After the coating has been properly mixed, it is suggested that it be kept under agitation during production.

Dilution

For most brush applications dilution is not required. However, when applying the AR series either by manual or selective spray equipment we recommend thinning to improve film coverage and precision.

The choice of which thinner to use will depend on the substrate type. For common plastics like ABS and polycarbonate, use MG's 4351 Thinner 1 system whereas for other plastics like polyamide

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or PVC, a more aggressive thinner like MG's 435 is recommended. Refer to Table 1 below for suggested starting dilution ratios.

Cat. No.	Dilution Ratio
838AR	2:1
841AR	1:1
842AR	2:1
843AR	Not required

Table 1. Dilution ratios AR Series

Paint Brush

1. Dip a clean brush into the paint ($\frac{1}{3}$ of the bristle length) to load it.
2. Tap both sides of the brush lightly against the side of can. This avoids drips and runs.
3. Brush the coating on board using long, smooth strokes. This reduces possible air entrapment, helps create an even coat, and minimizes brush marks.
4. Reload brush as soon as the coating flow starts to break.
5. Keep subsequent brush strokes in the same direction; work brush into the edges of previously applied wet coating, but do not coat over wet areas.
6. Wait at least 3 minutes, and apply another coat. Keep brush from curing by dipping it in thinner, and dry brush before reuse.
7. Apply additional coats until the desired thickness is achieved.

Manual Spray Guns

Dilute your paint as per Table 1. Use a standard fluid nozzle gun to spray the diluted paint. The settings listed in Table 2 below are recommendations, however performance will vary between brands.

	LVMP	HVLP
Inlet pressure	5–15 psi	5–15 psi
Air flow	10–15 SCFM	8.3 SCFM
Air cap	5–10 psi	5–10 psi

Table 2. Recommended manual spray guns setting

Table 3 lists our recommendations for selecting a nozzle tip, depending on the type of filler that are used in our AR Series paints. However, nozzle tip with different diameters can be used depending on applications.

Cat. No.	LVMP	HVLP
838AR	1.2–1.4 mm	1.2–1.4 mm
841AR	1.2–1.4 mm	1.2–1.4 mm
842AR	1.2–1.4 mm	1.2–1.4 mm
843AR	1.2–1.8 mm	1.2–1.8 mm

Table 3. Nozzle tip diameter for spraying AR series paints

If using a pressure pot and agitator, keep the agitator at low mixing speed with air pressure of 20–50 psi. Use the lowest pressure necessary to keep the particles suspended.

For best results, keep the gun-to-surface distance constant. Move the gun in a straight line along the surface, avoiding arcing motions. Use spray-and-release strokes to avoid excess coat in one spot. If possible, start and end each stroke off the surface.

At production end or before extended stoppages, clean pot, purge fluid lines, and clean gun.

Selective Coating Equipment

For higher volume applications, paints can be applied via selective coating equipment.

Use a system with constant fluid recirculation to keep the particles from settling in the lines. Refer to Table 3 for choosing the fluid nozzle diameter. Fluid pressure of 5–10 psi is recommended depending on nozzle size. Thin the paint to adjust the viscosity to the level appropriate for the valve being used. Recommended dilution ratios in Table 1 can be used as the starting point.

Agitated Pressure Pots or Cups

Use a recirculation set up with an agitated pressure pot or a cup with agitator to prevent filler settlement. Transfer the pre-mixed paints to the pressure pot. Set mixing speed sufficiently high to avoid settling issues, but not so high as it can cause centrifugal effects that collect filler to the sides. Usually, 20 rpm

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or more is required. Preferably, use separate air lines for the air-driven mixer and the air gun. This avoids drop in mixing speed during spraying.

Aerosol Cans

Acrylic conductive paints also come in a convenient aerosol packaging. These cans are ready to spray.

1. Shake the can vigorously.
2. Spray a test pattern to ensure good flow quality.
3. Tilt the board at 45° and spray a thin, even coat from a distance of 20–25 cm (8–10 in). Use spray-and-release strokes with an even motion to avoid paint buildup in one spot. Start and end each stroke off the surface.
4. Wait 3 min before applying another coat, to avoid trapping solvent.
5. Rotate the board 90° and spray again to ensure good coverage.
6. Apply additional coats until desired thickness is achieved (go to step 3).
7. Let dry 3 min at room temperature before applying heat cure.
8. After use, clear the nozzle by inverting the can and briefly spraying until clear propellant comes out.

Curing Process

At room temperature, the AR Series is dry-to-touch (known as recoat time) in 3 minutes and is dry enough to handle after 20 minutes. A full cure takes about 24 hours. To accelerate the curing time let the coating dry at room temperature for 20 minutes; no wet spots should be visible. Then, put in a convection oven at 65 °C [149 °F] for 30 minutes.

Heating a fresh coat before flashing off can trap solvent in the binder system. This can cause bubbles and blistering, as well as harming the final coat properties and thickness.

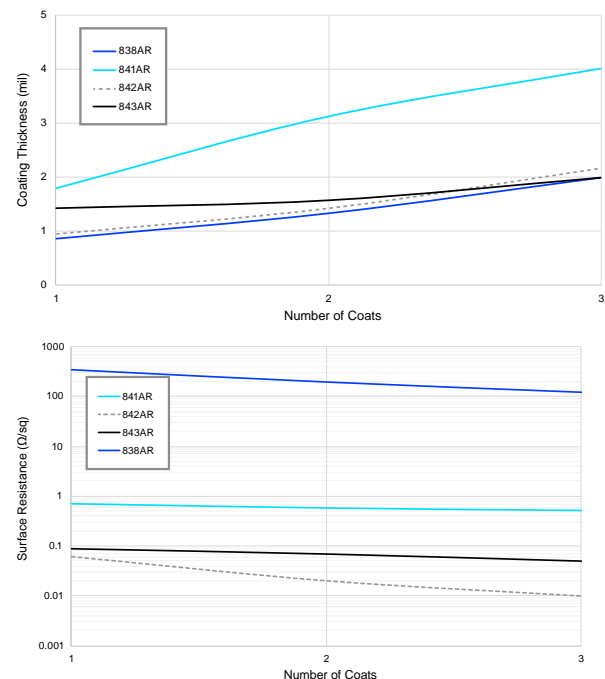
Coating Thickness

Surface resistance of conductive coating depends on the coat thickness. Typical individual coat thicknesses for each of the AR Series can be found in Table 4.

Cat. No.	Thickness per Coat	
838AR	1.0 mil	[25 µm]
841AR	1.5 mil	[38 µm]
842AR	0.75 mil	[19 µm]
843AR	2.0 mil	[51 µm]

Table 4. Typical coating thickness of AR Series

Below figures shows thickness and surface resistances of AR Series per number of coats.



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.

Contact Information

MG Chemicals, 1210 Corporate Drive
Burlington, Ontario, Canada L7L 5R6

Email: support@mgchemicals.com

Phone: North America: +(1)800-340-0772

International: +(1) 905-331-1396

Europe: +(44)1663 362888