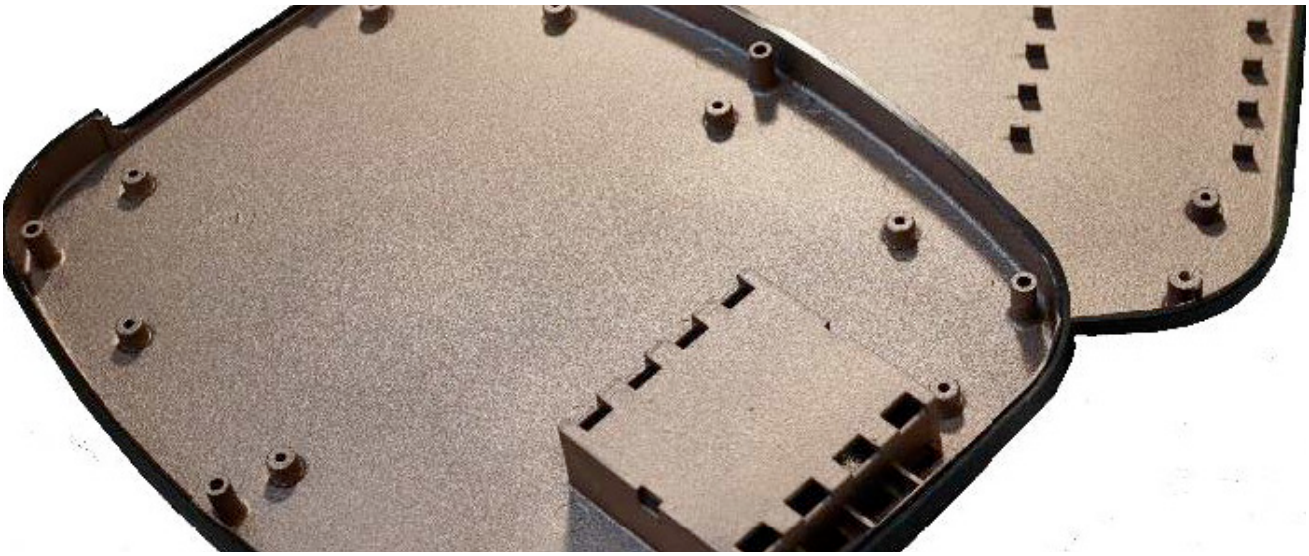
Conductive Coatings: Materials Data



Product Overview

Kemtron's partnership with MG Chemicals enables us to offer a full range of EMI shielding and conductive paints to provide protection against EMI (electromagnetic interference) and RFI (radio frequency interference).

Today most enclosures are made from plastic which offers no intrinsic protection from EMI or RFI. In order to achieve electromagnetic compatibility (EMC) the inner surfaces of plastic enclosures are coated with conductive or shielding paint.

Chemistries

- **Acrylic:** The most common coating widely used on electronic enclosures, satellite dishes and board level applications. Easy to apply, acrylic is durable and adheres well to many surfaces.
- **Water Based Urethane:** Low VOC (Volatile Organic Compound), it is the only choice in architectural applications. It has no noxious vapours and is non-flammable.
- **Epoxy:** Epoxy is mar and scratch resistant and is used when high durability is required. It has strong chemical, abrasion and impact resistance, together with very strong adhesion.

Pigments

- **Carbon:** Carbon is best used for low frequency shielding applications such as for grounding or musical instruments.
- **Nickel:** Nickel gives good shielding performance and excellent corrosion resistance.
- **Silver Coated Copper:** Silver coated copper gives superior shielding at higher frequencies.
- **Silver:** Silver offers the best shielding and corrosion resistance. As it can be applied very thinly, it is the best choice for board level shielding and mission critical applications.

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Conductive Coatings: Materials Data

General Characteristics

Dry Time	Adhesion and Durability	Shielding Attenuation	Coating Thickness	Ease of Use
FASTEST	**STRONGEST**	**HIGHEST**	**THINNEST**	**EASIEST**
Acrylic	Epoxy	Acrylic	Acrylic	Acrylic
Epoxy	Acrylic	Water Based Urethane	Water Based Urethane	Water Based Urethane
Water Based Urethane	Water Based Urethane	Epoxy	Epoxy	Epoxy
SLOWEST	**WEAKEST**	**LOWEST**	**THICKEST**	**HARDEST**

Substrate Adhesion

Resin System	Acrylic	Water Based Urethane	Epoxy
Acrylonitrile Butadiene Styrene (ABS)	Excellent	Excellent	Excellent
Polycarbonate (PC)	Excellent	Excellent	Excellent
Polyvinyl Chloride (PVC)	Excellent	Excellent	Excellent
Nylon 66 (Polyamide)	Excellent	Excellent	Excellent
Polypropylene (PP)	Poor	Poor	Poor
Glass	Poor	Poor	Excellent
Metal	Poor	Poor	Excellent
G-10 Fiberglass Epoxy	Excellent	Excellent	Excellent
Dry Wall	Good	Excellent	Good

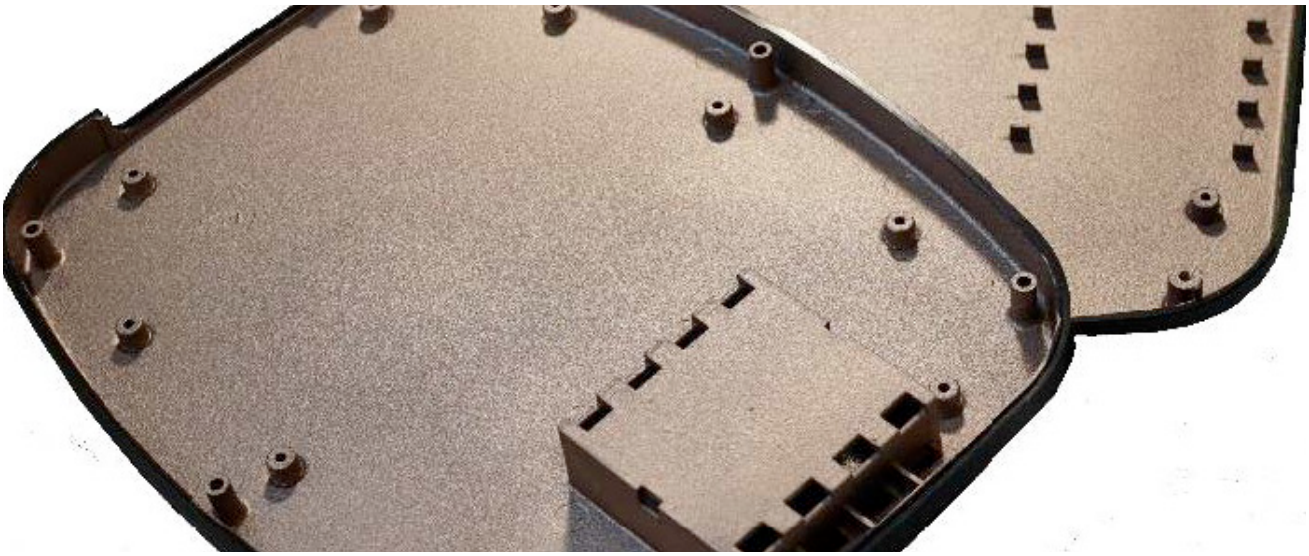
Performance Comparison of Coating Pigments

High Frequency Shielding Electrical Conductivity	Price	Corrosion Resistance	Suitability for Electroplating	Minimum Coating Thickness
HIGH	**HIGHEST**	**HIGHEST**	**MOST**	**THIN**
Silver	Silver	Carbon	Silver	Silver
Silver Coated Copper	Silver Coated Copper	Silver	Silver Coated Copper	Carbon
Nickel	Nickel	Nickel	Nickel	Nickel
Carbon	Carbon	Silver Coated Copper	Carbon	Silver Coated Copper
LOW	**LOWEST**	**LOWEST**	**LEAST**	**THICK**

Production Selection Chart (Pigment/Resin System Combination)

	Resin System		
Pigment System	Acrylic	Water Based Urethane	Epoxy
Carbon	FS-838AR	N/A	N/A
Nickel	FS-841AR	FS-841ER	FS-841WB
Silver Coated Copper	FS-843AR	FS-843ER	FS-843WB
Silver	FS-842AR	N/A	FS-842WB

Conductive Coatings: Acrylic Conductive Coatings



Product Overview

The AR (acrylic conductive coatings) series are durable acrylic lacquers pigmented with highly conductive fillers. They are an easy to use solvent based system with no heat cure necessary and provide effective EMI/RFI (electromagnetic interference/radio frequency interference) shielding over a broad frequency range. The coatings have strong adhesion to plastics and provide a smooth, hard, abrasion resistant finish. Drying time is 24 hours at 25°C and 30 minutes at 65°C.

Kemtron's partnership with MG Chemicals enables us to offer a full range of EMI shielding and conductive paints to provide protection against EMI (electromagnetic interference) and RFI (radio frequency interference).

Features and Benefits

- Available in carbon, nickel, silver coated copper or silver
- Supplied in cans (liquid), jars (liquid) and certain paints in aerosol format
- Fast drying time, no heat required
- Strong adhesion to acrylic, acrylonitrile butadiene styrene (ABS), polycarbonate (PC) and other injection moulded plastics
- Service temperature range -40°C to 120°C
- Mild solvent system
- Does not contain xylene or toluene
- Easily applied
- Smooth, durable and abrasion resistant conductive coating
- Low volatile organic compound (VOC)
- RoHS compliant.

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Conductive Coatings: Acrylic Conductive Coatings

Acrylic Conductive Coating Comparison Chart

Uncured Working Properties	FS-838AR	FS-841AR	FS-843AR	FS-842AR
Conductive Filler	C (Carbon)	Ni (Nickel)	Ag/Cu (Silver Coated Copper)	AG (Silver)
Format	Liquid	Liquid	Liquid	Liquid
Colour	Black	Dark Grey	Light Metallic Brown	Metallic Silver
Solids Percentage	15%	57%	31%	61%
Density @ 25°C	0.85g/ml	1.7g/ml	1.1g/ml	1.7g/ml
Viscocity @ 25°C	154cP	1460cP	<30cP	873cP
VOC Content	47%	14%	17%	12%
Shelf Life	24 months	24 months	24 months	24 months
Coverage & Application Properties				
Ready to Spray	No	No	Yes	No
Theoretical HVLP Spray Coverage	≤25 300cm²L	≤29600cm²L	≤15,000cm²L	≤59,600cm²L
Recoat Time	3 minutes	3 minutes	3 minutes	3 minutes
Drying Time @ 25°C	24 hours	24 hours	24 hours	24 hours
Drying Time @ 65°C	30 minutes	30 minutes	30 minutes	30 minutes
Cured Properties				
Electrical:				
Volume Resistivity	0.33Ω.cm	0.0040Ω.cm	0.00030Ω.cm	0.00010Ω.cm
Volume Conductivity	3.1 S/cm	250 S/cm	3300 S/cm	9,337 S/cm
Surface Resistance @ 1 coat	170Ω/sq	0.52Ω/sq	0.071Ω/sq	<0.01Ω/sq*
Surface Resistance @ 2 coats	60Ω/sq	0.38Ω/sq	0.018Ω/sq	<0.01Ω/sq*
Attenuation from 0.1 to 18,000MHz	23dB ± 25dB	59dB ± 12dB	65dB ± 11dB	73dB ± 11dB
Salt Fog Test @ 35°C, 96h**	Before: 70Ω/sq – After: 70Ω/sq	Before: 0.38Ω/sq – After: 0.51Ω/sq	Before: 0.08Ω/sq – After: 3.3Ω/sq	Before: 0.01Ω/sq – After: 0.05Ω/sq
Thermal:				
Constant Service Temperature	-40°C-120°C	-40°C-120°C	-40°C-120°C	-40°C-120°C
Intermittent Temperature Limits	-50°C-125°C	-50°C-125°C	-50°C-125°C	-50°C-125°C
Mechanical:				
Adhesion**	5B	5B	5B	5B
Pencil Hardness**	H, Hard	3H, Hard	F, medium	3H, Hard
Magnetic:				
Magnetic Class	Diamagnetic (NM)	Ferromagnetic (M)	Diamagnetic (NM)	Diamagnetic (NM)
Relative Permeability	<1.0	≥100	<1.0	<1.0

Values for conductive coatings in aerosol format will vary slightly. Please see product TDS for exact values.
*Readings less than 0.01Ω/sq are below the detection limit of the test apparatus
**Tested on acrylonitrile butadiene styrene (ABS)

Notice

Conductive Coatings: Acrylic Conductive Coatings

FS-838AR – Total Ground™ Carbon Conductive Coating

FS-838AR – Total Ground™ Carbon Conductive Coating is ideal for grounding or low frequency RFI shielding applications such as electric guitars and other electronic instruments, metal detectors and other devices affected by the presence of metal.

- Provides >52dB shielding at <1MHz
- Volume resistivity 0.33Ω/cm liquid
- Application by spray, brush or pen (see Conductive Pen section)
- Strong corrosion resistance and suitable for marine environments.

How to Order

Part No.	Packaging	Net Volume	Net Weight
FS-838AR-90MLI	Can	850ml	725g
FS-838AR-3.78L	Can	3.60L	3.07kg
FS-838AR-15ML	Jar	12ml	10.2g

FS-841AR – Super Shield™ Nickel Conductive Coating

FS-841AR – Super Shield™ Nickel Conductive Coating is a good standard choice for shielding plastic enclosures or satellite dishes. It can also be used as a conductive undercoat in many electroplating applications.

- Provides effective EMI/RFI shielding over a broad frequency range
- Volume resistivity of 0.0040Ω/cm for liquid, 0.0076Ω/cm for aerosol
- Application by spray, aerosol, brush or pen (see Conductive Pen section)
- Corrosion resistant and suitable for marine environment.

How to Order

Part No.	Packaging	Net Volume	Net Weight
FS-841AR-340G	Aerosol	Not Established	340g
FS-841AR-150ML	Can	150ml	253g
FS-841AR-900ML	Can	850ml	1.43kg
FS-841AR-3.78L	Can	3.60L	6.07kg
FS-841AR-15ML	Jar	12ml	20.2g

FS-843AR – Super Shield™ Silver Coated Copper Conductive Coating

FS-843AR – Super Shield™ Silver Coated Copper Conductive Coating provides superior EMI/RFI shielding to plastic enclosures and is also suitable for some board level applications. It can also be used as a conductive undercoat in many electroplating applications.

- Provides very good electromagnetic EMI/RFI shielding over a broad frequency range
- Volume resistivity of 0.0003Ω/cm for liquid, 0.0014Ω/cm for aerosol
- Application by spray or aerosol
- Ready to spray liquid format, no need for thinners
- Low volatile organic compound (VOC) content, methyl ethyl ketone (MEK) free.

How to Order

Part No.	Packaging	Net Volume	Net Weight
FS-843AR-340G	Aerosol	Not Established	340g
FS-843AR-900ML	Can	850ml	927g

FS-842AR – Super Shield™ Silver Conductive Coating

FS-842AR – Super Shield™ Silver Conductive Coating provides the highest level EMI/RFI shielding for electronic enclosures. It is suitable for board level applications and may also be used as an undercoat in most electroplating applications.

- Provides excellent EMI/RFI shielding over a broad frequency range
- Volume resistivity of 0.0001Ω/cm for liquid, 0.000076Ω/cm for aerosol
- Can be applied by spray, brush or pen (see Conductive Pen section)
- Extremely corrosion resistant and suitable for harsh marine environments
- Low volatile organic compound (VOC) content, methyl ethyl ketone (MEK) free.

How to Order

Part No.	Packaging	Net Volume	Net Weight
FS-842AR-150ML	Can	150ml	260g
FS-842AR-900ML	Can	850ml	1.47kg
FS-842AR-15ML	Jar	12ml	12.8g

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Conductive Coatings:
Water Based Urethane Conductive Coatings

Product Overview

The water based conductive coatings are urethane systems pigmented with highly conductive fillers. Easy to use with no heat cure necessary, the cured coatings are smooth, durable and adhere well to plastics, wood, metal and ceramics. They also bond well to drywall and can be painted over with common latex paints. Drying time is 24 hours at 25°C and 2.5-3 hours at 65°C. The paint can be re-coated after 30 minutes.

Kemtron's partnership with MG Chemicals enables us to offer a full range of EMI shielding and conductive paints to provide protection against EMI (electromagnetic interference) and RFI (radio frequency interference).

Features and Benefits

- Effective EMI/RFI shielding over a broad range of frequencies
- Ready to use – no dilution required
- Apply by spray gun, roller or brush
- Can be painted over with common architectural paints
- Excellent adhesion to drywall
- Safe on delicate plastics
- Cures at room temperature
- Good adhesion to ABS, polycarbonate and other injection moulded plastics
- Good adhesion to wood, ceramics, copper and aluminium
- Non flammable
- Good environmental resistance
- Low regulated VOC content allows for use in architectural application.

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Conductive Coatings: Water Based Urethane Conductive Coatings

Water Based Urethane Conductive Coating Comparison Chart

Uncured Working Properties	FS-841WB	FS-843WB	FS-842WB
Conductive Filler	Ni (Nickel)	Ag/Cu (Silver Coated Copper)	AG (Silver)
Format	Liquid	Liquid	Liquid
Colour	Grey	Light Metallic Brown	Silver
Solids Percentage	54%	42%	60%
Density @ 25°C	1.8g/ml	1.3g/ml	1.5g/ml
Viscocity @ 25°C	143cP	234cP	195cP
VOC Content	145G/L	51G/L	53g/L
Shelf Life	12 months	12 months	12 months
Coverage & Application Properties			
Ready to Spray	Yes	Yes	Yes
Theoretical HVLP Spray Coverage	≤15200cm²L	≤42200cm²L	≤690000cm²L
Recoat Time*	30 minutes	20 minutes	20 minutes
Drying Time @ 25°C	24 hours	24 hours	24 hours
Drying Time @ 65°C	3 hours	2.5 hours	3 hours
Cured Properties			
Electrical:			
Volume Resistivity	0.027Ω.cm	0.000680Ω.cm	0.000075Ω.cm
Volume Conductivity	37 S/cm	1470 S/cm	13300 S/cm
Surface Resistance @ 1 coat	1.4Ω/sq	0.21Ω/sq	<0.04Ω/sq*
Surface Resistance @ 2 coats	0.68Ω/sq	0.11Ω/sq	<0.02Ω/sq*
Attenuation from 0.1 to 18,000MHz	46dB ± 16dB	61dB ± 12dB	65dB ± 11dB
Salt Fog Test @ 35°C, 96h**	Before: 0.4Ω/sq – After: 3.0Ω/sq	TBD	Before: 0.012Ω/sq – After: 0.061Ω/sq
Thermal:			
Constant Service Temperature	-40°C-120°C	-40°C-120°C	-40°C-120°C
Intermittent Temperature Limits	-50°C-125°C	-50°C-125°C	-50°C-125°C
Mechanical:			
Adhesion**	5B	5B	5B
Pencil Hardness**	HB, Hard	HB, Hard	HB, Hard
Magnetic:			
Magnetic Class	Ferromagnetic (M)	Diamagnetic (NM)	Diamagnetic (NM)
Relative Permeability	≥100	<1.0	<1.0

TBD = To be determined
M = Magnetic, NM = Non-magnetic
*Recoat time for plastic. Dry wall recoat times can be found on the TDSs.
**Tested on acrylonitrile butadiene styrene (ABS)

Notice

Information supplied in these data sheets is based on independent and laboratory tests which Kemtron believes to be reliable. Kemtron has no control over the design of customer's product which incorporates Kemtron's products, therefore it is the responsibility of the user to determine the suitability for his particular application and we recommend that the user make his own test to determine suitability.

The product described in this data sheet shall be of standard quality, however the products are sold without warranty of fitness for a particular purpose, either expressed or implied, except to the extent expressly stated on Kemtron's invoice, quotation or order acknowledgement. Kemtron does not warrant that products described in this data sheet will be free of conflict with existing or future patents of third parties. All risks of lack of fitness, patent infringement and the like are assumed by the user.

Conductive Coatings: Water Based Urethane Conductive Coatings

FS-841WB – Super Shield™ Water Based Nickel Conductive Coating

FS-841WB – Super Shield™ Water Based Nickel Conductive Coating provides effective shielding for electronic enclosures and in most common architectural applications.

- Effective EMI/RFI shielding over a broad frequency range
- Volume resistivity of 0.027Ω/cm
- Corrosion resistant.

How to Order

Part No.	Packaging	Net Volume	Net Weight
FS-841WB-150ML	Can	150ml	271g
FS-841WB-850ML	Bottle	850ml	1.83kg
FS-841WB-3.78L	Can	3.60L	6.51kg
FS-841WB-15ML	Jar	12ml	21.7g

FS-842WB – Super Shield™ Water Based Silver Conductive Coating

FS-842WB – Super Shield™ Water Based Silver Conductive Coating provides excellent shielding for electronic enclosures and in architectural applications.

- Excellent EMI/RFI shielding over a broad frequency range
- Volume resistivity of 0.000075Ω/cm
- Corrosion resistant.

How to Order

Part No.	Packaging	Net Volume	Net Weight
FS-842WB-150ML	Bottle	150ml	224g
FS-842WB-850ML	Can	850ml	1.27kg
FS-842WB-15ML	Jar	12ml	20.8g

FS-843WB – Super Shield™ Water Based Silver Coated Copper Conductive Coating

FS-843WB – Super Shield™ Water Based Silver Coated Copper Conductive Coating provides superior shielding for electronic enclosures and in architectural applications. It is also suitable for server rooms.

- Provides superior EMI/RFI shielding over a broad frequency range
- Volume resistivity of 0.0006FS-8Ω/cm.

How to Order

Part No.	Packaging	Net Volume	Net Weight
FS-843WB-150ML	Bottle	150ml	195g
FS-843WB-850ML	Can	850ml	1.10kg
FS-843WB-15ML	Jar	12ml	N/A

Conductive Coatings: Epoxy Conductive Coatings

Product Overview

The epoxy conductive coatings are a two part system pigmented with highly conductive fillers. Curing in 24 hours at room temperature, or 2 hours at 80°C, the cured coatings are smooth and extremely hard. Abrasion, scratch and mar resistant, they also provide good chemical resistance and adhere strongly to plastics, including chemically resistant and low energy plastics. They are available in two pigments, nickel or silver coated copper.

Kemtron's partnership with MG Chemicals enables us to offer a full range of EMI shielding and conductive paints to provide protection against EMI (electromagnetic interference) and RFI (radio frequency interference).

Features and Benefits

- Excellent EMI/RFI shielding across a broad range of frequencies
- Vibration, abrasion and impact resistant
- Will not flake, scratch or mar
- Very strong adhesion to chemically resistant plastics and other difficult to bond to materials
- Chemically resistant
- Suitable for military, automotive, aerospace, oil and gas industries
- Suitable on aluminium flanges.

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Conductive Coatings: Epoxy Conductive Coatings

Epoxy Conductive Coating Comparison Chart

Uncured Working Properties	FS-841ER	FS-843ER
Conductive Filler	Ni (Nickel)	Ag/Cu (Silver Coated Copper)
Format	Liquid	Liquid
Colour	Grey	Metallic Brown
Mix ratio by weight	4:1	100:28
Mix ratio by volume	100:38	100:36
Solids Percentage	32%	30%
Density @ 25°C	1.64g/ml	1.0g/ml
Viscocity @ 25°C	200cP (Part A), 18cP (Part B)	35Cp (Part A), 9cP (Part B)
VOC Content	49%	76%
Shelf Life	12 months	12 months
Coverage & Application Properties		
Ready to Spray	Yes	Yes
Theoretical HVLP Spray Coverage	≤40900cm²L	≤31100cm²L
Working Life @ 22°C	4 hours	8 hours
Recoat Time @ 22°C	5 minutes	3 minutes
Ambient Cure Time @ 22°C	-	24 hours
Elevated Cure Time	30 mins @ 22°C, then 4 hours @ 65°C, then 1 hour @ 22°C	2 hours @ 80°C
Cured Properties		
Electrical:		
Volume Resistivity	0.1Ω.cm	0.0018Ω.cm
Volume Conductivity	11 S/cm	556 S/cm
Surface Resistance @ 1 coat	72Ω/sq	0.3Ω/sq
Surface Resistance @ 2 coats	21Ω/sq	0.2Ω/sq
Attenuation from 0.1 to 18,000MHz	TBD	60dB ± 12dB
Salt Fog Test @ 35°C, 96h**	TBD	Before: 0.15Ω/sq – After: 0.73Ω/sq
Thermal:		
Constant Service Temperature	-40°C-150°C	-40°C-120°C
Intermittent Temperature Limits	-50°C-165°C	-60°C-130°C
Mechanical:		
Adhesion**	5B*	5B**
Pencil Hardness**	4H, Hard**	6H, Hard**
Magnetic:		
Magnetic Class	Ferromagnetic (M)	Diamagnetic (NM)
Relative Permeability	≥100	<1.0

TBD = To be determined
M = Magnetic, NM = Non-magnetic
* Tested on acrylonitrile butadiene styrene (ABS, polycarbonate (PC), polyvinyl chloride (PVC), glass, and aluminium
**Tested on acrylonitrile butadiene styrene (ABS)

Notice

FS-841ER – Super Shield™ Nickel Epoxy Conductive Coating

FS-841ER – Super Shield™ Nickel Epoxy Conductive Coating provides effective shielding and grounding for shielding applications in extreme environments.

- Volume resistivity 0.1Ω/cm
- Corrosion resistant.

How to Order

Part No.	Packaging	Net Volume	Net Weight
FS-841ER-1.17L	Can	1.17L	1.82kg
FS-841ER-3.25L	Can	3.25L	5.34kg

FS-843ER – Super Shield™ Silver Coated Copper Epoxy Conductive Coating

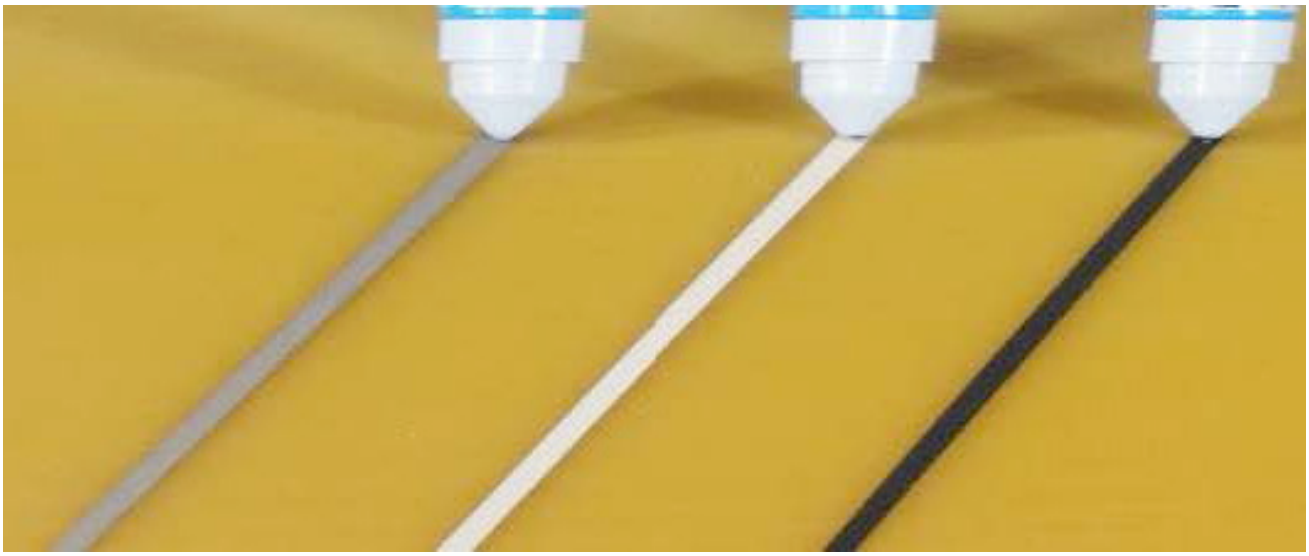
FS-843ER –Super Shield™ Silver Coated Copper Conductive Coating provides the highest level of EMI/RFI shielding for electronic enclosures and is also suitable for board level applications.

- Volume resistivity 0.002Ω/cm.

How to Order

Part No.	Packaging	Net Volume	Net Weight
FS-843ER-800ML	Can	810ml	895g

Conductive Coatings: Conductive Pens



Product Overview

Used for repairing conductive traces, or by the hobbyist, the conductive pens make it easy to draw or repair conductive traces. The pens dispense acrylic lacquer which is pigmented with carbon powder, nickel or silver flake dependent on the application and required volume resistivity.

Designed for use on smooth, hard and flat surfaces, the valve tip opens up when pressed against the drawing surface, the flow controlled by pressure on the barrel.

Kemtron's partnership with MG Chemicals enables us to offer a full range of EMI shielding and conductive paints to provide protection against EMI (electromagnetic interference) and RFI (radio frequency interference).

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Conductive Pens Comparison Chart

Uncured Working Properties	FS-838AR-P	FS-841AR-P	FS-8842AR-P
Conductive Filler	C (Carbon)	Ni (Nickel)	AG (Silver)
Colour	Black	Dark Grey	Metallic Silver
Solids Percentage	15%	57%	61%
Density @ 25°C	0.84g/ml	1.51g/ml	1.7g/ml
Viscocity @ 25°C	319cP (368mm²/S)	161cP (106mm²/S)	873cP (503mm²/S)
VOC Content	43% (370g/L)	14% (236g/L)	12% (200g/L)
Shelf Life	24 months	24 months	24 months
Coverage & Application Properties			
Handling Time	10 minutes	10 minutes	10 minutes
Theoretical Pen Coverage*	≤71cm²	≤225cm²	≤450cm²
Drying Time @ 25°C	24 hours	24 hours	24 hours
Drying Time @ 65°C	30 minutes	30 minutes	30 minutes
Cured Properties			
Electrical:			
Volume Resistivity	0.467Ω.cm	0.0068Ω.cm	0.0001Ω.cm
Surface Resistance @ 1 coat	170Ω/sq	0.52Ω/sq	<0.01Ω/sq**
Surface Resistance @ 2 coats	60Ω/sq	0.38Ω/sq	<0.01Ω/sq**
			65dB ± 11dB
Thermal:			
Constant Service Temperature	-40°C-120°C	-40°C-120°C	-40°C-120°C
Intermittent Temperature Limits	-50°C-125°C	-50°C-125°C	-50°C-125°C
Mechanical:			
Adhesion, ABS	5B	5B	5B
Pencil Hardness, ABS	H, Hard	3H, Hard	3H, Hard
Magnetic:			
Magnetic Class	Diamagnetic (NM)	Ferromagnetic (M)	Diamagnetic (NM)
Relative Permeability	≥1.0	≥100	<1.0

* Idealised estimate based on a coat thickness of 25-50µm (1-2mil) and a 100% transfer efficiency
**Readings less than 0.01Ω/sq are below the detection limits of the handheld multimeter and square probe method

Notice

Conductive Coatings: Conductive Pens

FS-838AR-P – Carbon Conductive Pen

Fast drying, the carbon conductive pen can be used to quickly create conductive traces on a wide range of substrates. The paint is a tough acrylic polymer pigmented with high purity carbon black giving excellent corrosion resistance and high conductivity. Used to draw resistors, connect grounds in prototypes or restoring conductivity to contact surfaces.

Shake rigorously before use. Do not use on thin plastics or on plastic where the original surface is to remain intact. FS-838AR-P contains solvents designed to etch into the plastic surface in order to help adhesion, preventing peeling or flaking. Do not apply a total coating thickness of >2.0ml as this will cause the coating to crack. Store between -5°C and 40°C in a dry area. After use store the pen with the tip in the upwards position.

Features and Benefits

- Volume resistivity 0.46Ω/cm
- Typical trace width 1.0mm
- Touch dry in minutes (room temperature)
- Adheres to most electronic substrates such as plastics, copper, aluminium, ceramics, wood and epoxy
- Adheres to ABS, PLA and other 3D printed plastics
- Corrosion resistant
- Mild solvent – safe on polystyrenes
- Xylene and toluene free (RoHS compliant)
- Colour – black.

How to Order

Part No.	Packaging	Net Volume	Coating
FS-838AR-P	Pen	5ml	Carbon

FS-841AR-P – Nickel Conductive Pen

Highly conductive, the nickel conductive pen easily creates highly conductive, corrosion resistant traces and adheres to a wide range of substrates. The paint is an acrylic lacquer pigmented with highly conductive nickel flakes meaning cured traces are durable and corrosion resistant. Used to draw traces on circuit boards, repair damaged traces on printed circuit boards (PCBs) and other electronic boards, the paint is also used for filling gaps in EMI/RFI shielding.

Shake rigorously before use. Do not use on thin plastics or on plastic where the original surface is to remain intact. FS-841AR-P contains solvents designed to etch into the plastic surface in order to help adhesion, preventing peeling or flaking. Do not apply a total coating thickness of >2.0ml as this will cause the coating to crack. Store between -5°C and 40°C in a dry area. After use store the pen with the tip in the upwards position.

Features and Benefits

- Volume resistivity 0.006-8Ω/cm
- UL approved (E202609)
- Typical trace width 1.0mm
- Touch dry in minutes (room temperature)
- Adheres to most electronic substrates such as plastics, copper, aluminium, ceramics, wood and epoxy
- Adheres to ABS, PLA and other 3D printed plastics
- Corrosion resistant
- Xylene, toluene and MEK free (RoHS compliant, low VOC)
- Colour – dark grey.

How to Order

Part No.	Packaging	Net Volume	Coating
FS-841AR-P	Pen	5ml	Nickel

FS-842AR-P – Silver Conductive Pen

Extremely conductive, this fast drying paint creates durable, corrosion resistant, highly conductive traces and adheres to a wide range of substrates. The paint is a durable acrylic lacquer pigmented with extremely conductive silver flakes. Cured traces are hard wearing and corrosion resistant. Used on printed circuit boards, mixing boards and other electronic circuits for repairing damage or to create conductive traces.

Shake rigorously before use. Do not use on thin plastics or on plastic where the original surface is to remain intact. FS-842AR-P contains solvents designed to etch into the plastic surface in order to help adhesion, preventing peeling or flaking. Do not apply a total coating thickness of >2.0mil as this will cause the coating to crack. Store between -5°C and 40°C in a dry area. After use store the pen with the tip in the upwards position.

Features and Benefits

- Volume resistivity 0.0001Ω/cm
- Typical trace width 0.9mm
- Touch dry in minutes (room temperature)
- Adheres to most electronic substrates such as plastics, copper, aluminium, ceramics, wood and epoxy
- Adheres to ABS, PLA and other 3D printed plastics
- Superior corrosion resistant
- Mild solvent system
- Xylene, toluene and MEK free (RoHS compliant, low VOC)
- Colour – metallic silver grey.

How to Order

Part No.	Packaging	Net Volume	Coating
FS-842AR-P	Pen	5ml	Silver