

Epoxy Conductive Paints

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

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 ER Series can be removed with the MG's 435 Thinner/Cleaner, masking is often more efficient. Painters tap or MG's 862 Solder Mask can be used for masking.

Mixing

The ER Series come in two individual parts (part A resin and part B hardener) that need to be mixed together before use. When mixed, they form a mixture that is low enough in viscosity for both spray and brush applications. The mix ratios are included in Table 1 for the ER Series products.

MG Chemicals recommends the mix ratio to be measured by weight as it is more accurate than measuring by volume.



1. Scrape any settled material in the Part A container and stir until homogeneous, then repeat with Part B.
2. Weigh a desired amount of the pre-stirred Part A, then add it into the mixing container.
3. As per Table 1, weigh the amount of pre-stirred Part B, then add it into the mixing container with Part A. Mix both parts together thoroughly.

Cat. No.	Volume	Weight
841ER	100:38	100:25
842ER	100:20	100:10
843ER	100:36	100:28

Table 1. Mix ratio by volume (A:B) and weight (A:B) for ER Series

Dilution

Dilution is not required for the ER Series.

Paint Brush

The paint brush method can be used for repairs or for small scale applications.

1. Mix part A and Part B according to mixing instructions provided in the Mixing section.
2. Dip a clean brush into the paint ($\frac{1}{3}$ of the bristle length) to load it.
3. Tap both sides of the brush lightly against the side of can. This avoids drips and runs.
4. Brush the coating on board using long, smooth

strokes. This reduces possible air entrapment, helps create an even coat, and minimizes brush marks.

5. Reload brush as soon as the coating flow starts to break.
6. 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.
7. Wait at least 7 minutes, and apply another coat. Keep brush from curing by dipping it in thinner, and dry brush before reuse.
8. If required, apply additional coats until the desired thickness is achieved.

Paint Roller

The ER Series can also be applied by paint roller. Paint roller applications of these paints require a skilled technique, and should be practiced on a test substrate prior to a full scale application.

1. Mix part A and Part B according to mixing instructions provided in the Mixing section.
2. Quickly load the paint roller with paint.
3. Apply the paint roller to the surface to be coated. Do not do more than 2-3 strokes over the same location. Quickly move on to the next area after an area has been sufficiently coated.
4. Reload the paint roller as soon as the strokes are not applying sufficient coating for adequate coverage.
5. Keep subsequent strokes in the same direction; overlay the subsequent strokes.
6. Wait at least 5 minutes, then apply another coat. During waiting periods, ensure the paint roller is completely cleaned and dry prior to the second coat.
7. If required, apply additional coats until the desired thickness is achieved.

Manual Spray Guns

Use a standard fluid nozzle gun to spray the mixed paint. The settings listed 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 ER Series paints. However, nozzle tips with different diameters can be used depending on applications.

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

Table 3. Nozzle tip diameter for spraying the ER 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 the gun thoroughly.

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.

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 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.

Curing Process

At room temperature, the ER Series is dry-to-touch (known as recoat time) in 3 to 5 minutes. 841ER and 842ER can be handled in 4 hours, while 8 hours is required for the 843ER. To accelerate the curing time let the coating dry at room temperature for 20 minutes and then, put in a convection oven. Consult the product's technical data sheet for more information on ER Series cure schedule.

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.

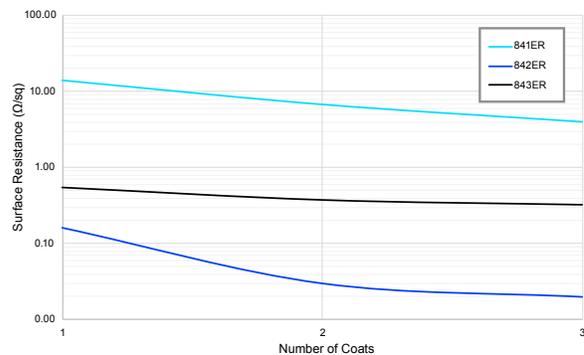
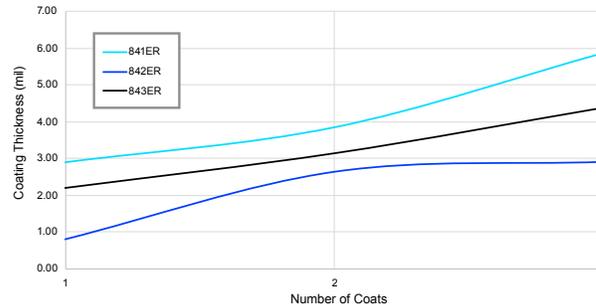
Coating Thickness

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

Cat. No.	Thickness per Coat	
841ER	1.6 mil	[40 μm]
842ER	0.8 mil	[20 μm]
843ER	2.0 mil	[50 μm]

Table 4. Typical coating thickness of ER Series

The below figures show the thickness and surface resistances of ER 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.

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