

Description

The 838 *Total Ground Carbon Conductive Coating* is an economical acrylic paint that is used to create conductive, static free surfaces. Coated surfaces also serve to reduce electromagnetic or radio frequency interference (EMI/RFI) to some degree. The durable acrylic resin affords long-term protection that minimizes loss of carbon through rubbing. The cured coat withstands large temperature changes and marine environmental conditions without cracking, which makes it suitable for a wide range of application.

Applications & Usages

Its primary applications are to ground working surfaces and to avoid static, but it can also be used to provide low cost EMI/RFI shielding, as a conductive base for some electroplating process, or anywhere in a manufacturing process where it is necessary to impart conductivity to a surface.

Benefits

- **Conductive Material Classification—Low Surface resistivity** of 250 Ω /sq for one coat (1 mil)
- **Tough and durable coating, salt spray tested with excellent weatherability**
- **Repairable and removable thermoplastic paint system**
- **Stronger adhesion than water based coatings**
- **Corrosion-proof coat**—slows or prevents substrate oxidation
- **Rub off resistant**

ENVIRONMENT
Meets RoHS directive

Curing & Work Schedule

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

a) The product must stay within the storage temperature limits stated. **ATTENTION!** Aerosol container will be crushed at ≤ -26.5 °C [≤ 15.7 °F].

Service Ranges

<i>Properties</i>	<i>Value</i>
Service Temperature	-40 to +120 °C [-40 to +248 °F]
Maximum coverage for 25 μ m [1.0 mil] ^{b)}	<8 400 cm ² [<9 ft ²]

b) Typical thickness for first coat

Principal Components

Name	CAS Number
Carbon Black	1333-86-4
Acrylic Resin	9003-01-4
Acetone	67-64-1
Ethanol	64-17-5
Toluene	108-88-3

Properties of Cured 838

<i>Electric Properties</i>	<i>Method</i>	<i>Value</i>
Surface Resistance : 1 × coat @ 1.0 mil : 2 × coats @ 1.5 mil : 3 × coats @ 2.0 mil	Square probe Square probe Square probe	<i>Resistance</i> ^{a)} <i>Conductance</i> ^{a)} 250 Ω/sq 3.8 mS 190 Ω/sq 5.1 mS 160 Ω/sq 6.5 mS
<i>Physical Properties</i>	<i>Method</i>	<i>Value</i>
Color Paint type Abrasion resistant Blister resistant Peeling resistant	Visual — — — —	Greyish Black Lacquer (thermoplastic) Yes Yes Yes
<i>Environmental & Ageing Study</i> ^{a)}	<i>Method</i>	<i>Value</i>
Salt Spray Test: 7 day @35 °C +Salt/Fog Cross-hatch adhesion Cracking, unwashed area Visual Color, unwashed area Peeling, unwashed area	ASTM B117-2011 ASTM D3359-2009 ASTM D661-93 ASTM D1729-96 ASTM D1729-96	5B = 0% area removed None Unchanged None

Note: The first coat thickness is typically around 25 μm [1 mil].

a) Surface resistance is given in Ω/sq and the corresponding conductance in Siemens (S or Ω⁻¹)

Surface Resistance by Coating Thickness

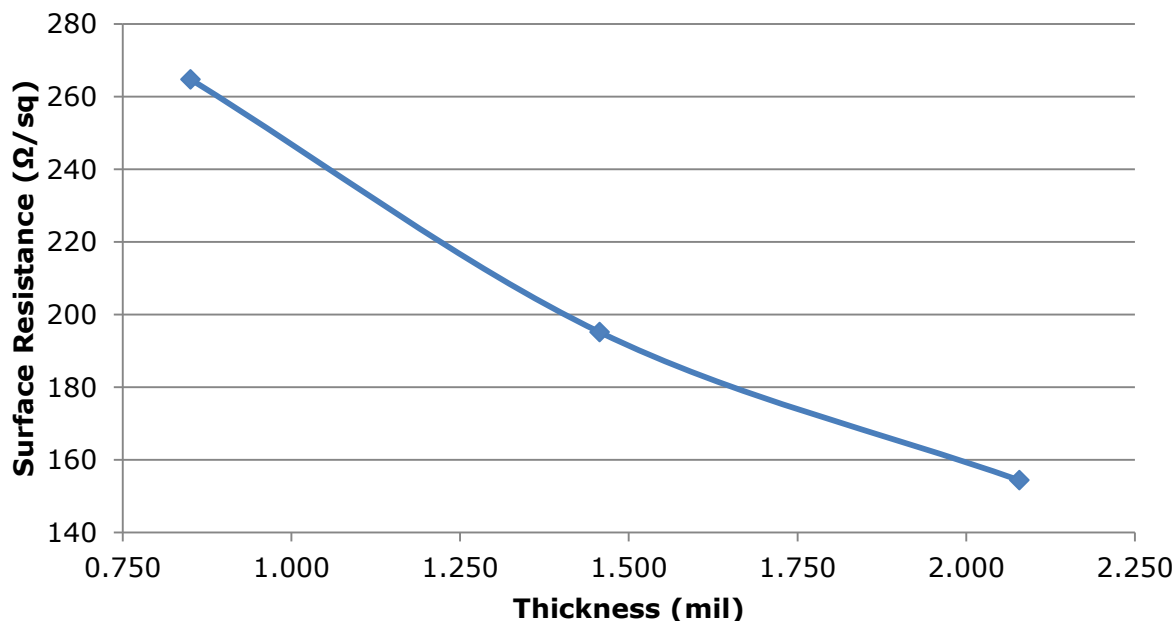


Figure 1. Carbon conductive coating surface resistance for one, two, and three coats thickness

Properties of Uncured 838

<i>Physical Property</i>	<i>Mixture</i>
Color	Black
Density	0.89 g/mL
Solids Percentage (wt/wt) ^a	~18%
Flash Point	-16 °C [3.2 °F]
Odor	Ethereal

a) Percentage for liquid only (without propellant)

Compatibility

Chemical—Carbon doesn't oxidize or deteriorate under a normal environment and conditions, including marine environments as seen by the salt spray test results (see page 2).

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 offer great repair and rework characteristics.

Adhesion—The 838 coating adheres to most materials used to house 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.

838 Adherence Compatibility

<i>Substrate</i>	<i>Note</i>
Acrylonitrile Butadiene Styrene (ABS)	<i>Chemically etches^a and adheres well to this substrate.</i>
Polybutylene Terephthalate (PBT)	"
Polycarbonate	"
Polyvinyl Acetate (PVA)	"
Acrylics or acrylic paints	Adheres well to clean surface
Polyurethane	Adheres well to clean surface for most urethane types
Wood	Adheres well with surface preparation

a) Etching is similar to sanding, except that it also softens the surface helping to meld the paint to the plastic for superior adhesion.

ATTENTION! Do not use on thin plastics or on plastics where you want to keep original surface intact. The 838 spray contains solvents designed to chemically etch plastic surfaces to help adhesion by melding the acrylic coating into the plastic substrate. This prevents flaking or peeling.

Storage

Store between -5 °C and 40 °C [23°F and 104 °F] in dry area away from sunlight. Temperatures below or above these outer limits will result in the container being crushed and/or ruptured.

Health, Safety, and Environmental Awareness

Please see the 838 **Material Safety Data Sheet** (MSDS) for greater details on transportation, storage, handling and other security guidelines.

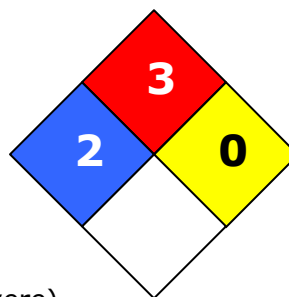
Environmental Impact: The volatile organic content is 15.2% (136 g/L) by EPA and WHMIS standards.

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

HMIS® RATING

HEALTH:	2
FLAMMABILITY:	3
PHYSICAL HAZARD:	0
PERSONAL PROTECTION:	

NFPA® 704 CODES



Approximate HMIS and NFPA Risk Ratings Legend:

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

Health and Safety: The solvents in 838 can ignite if exposed to flames or sparks and can cause respiratory track irritation. If ignited, then flame flash back is possible. Use in well-ventilated area.

Solvents can cause skin irritation and have some reproductive effects. Wear safety glasses or goggles and disposable gloves to avoid exposures.

Aerosol Application Instructions

Follow the procedure below for best results. We recommend a coat with a dry film thickness of roughly 1 mil [25 µm]. For thicker coats, apply many thin coats as opposed to spraying a single thick coat.

Prerequisites

- Ensure surface to be coated is oil free, dust free and clean

To apply the required thickness by weight

1. Shake the can vigorously for 2 minutes.
2. Spray a test pattern.
3. At a distance of 20 to 25 cm (8 to 10 inches), spray a thin, 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.
4. Clear valve according to the valve clearing procedure.
5. Wait 5 minutes, shake can, and spray another coat.
6. Apply additional coats until desired thickness is achieved. (Go to Step 1)
7. Let cure according to curing procedure.

NOTE: For new coats, change stroke direction (horizontal or vertical) to ensure good coverage.

ATTENTION!

- Failure to hold can vertical during spray application may result in uneven application with time.
- Coats that are applied too thick cause runs and hampers solvent evaporation.
- Spraying onto horizontal surfaces is not recommended.

To cure at Room temperature

- Let air dry 24 hours

To heat cure

- Wait 20 min or more for the coating to be dry to touch.
- Put in an oven or under heat lamp at 65 °C for 30 min.

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

After use, clear the nozzle of the aerosol

1. Invert the aerosol can upside down.
2. Press button until clear propellant comes out. The propellant should become clear in a few seconds.

ATTENTION! Failure to clear nozzle can lead to valve being blocked open or closed in a non-noticeable way.

- If blocked closed, the can will not be usable.
- If blocked slightly open, the contents can spill out overnight creating a mess.



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

Total Ground Carbon Conductive Coating 838 Technical Data Sheet

838-Aerosol

Packaging and Supporting Products

<i>Cat. No.</i>	<i>Form</i>	<i>Net Volume</i>	<i>Net Weight</i>	<i>Shipping Weight</i>
838-340G	aerosol	0.375 L 12 oz	0.21 kg 0.47 lb	0.3 kg ^a 0.6 lb ^a

a) pack of 6 cans

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.

Email: support@mgchemicals.com

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Warranty

M.G. Chemicals Ltd. warrants 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.

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