



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

Super Shield™ Water Based Nickel Conductive Coating 841WB Technical Data Sheet

841WB-Liquid

Description

The 841WB *Super Shield™ Water Based Nickel Conductive Coating* is a conductive paint designed to reduce electromagnetic or radio frequency interference (EMI/RFI) in architectural and electronic applications. It is a one-part, easy-to-use, ready-to-spray coating that combines a durable water-based urethane binder with high-purity nickel flakes to provide long-term protection.

Applications & Usages

Water-based conductive paints are the only choice for architectural RFI shielding because regulations promote products with higher safety and prohibit the use of high VOC solvent systems in architectural coatings. Large applications of water-based paints are less hazardous than their solvent-based counterparts since they don't emit large quantities of solvent vapors that can lead to fire, smog, and health hazards. Because they are less hazardous than solvent-based systems, water based paints often can be shipped as non-dangerous goods. Lastly, the water-based paints like the 841WB offer great performance and shielding characteristics for uses in electronic devices, homes, and buildings.

The 841WB shielding paint bonds well to drywall and can easily be painted over with regular architectural paints. The cured coating is tough, durable, and provides effective shielding. Typical applications include containing internal RFI interferences within a room, such as an engine room, to avoid creating EMI/RFI noise in nearby rooms and external areas. It also protects rooms containing sensitive electronic equipment—such as server rooms, laboratories, and surgical rooms—from external interference sources, which is especially important if there is a strong noise source nearby, such as a cell phone or radio tower.

At an electronic device level, the 841WB can be used instead of solvent-based shielding paints. For example, it can provide EMI/RFI shielding for electronic enclosures used in sensors, test equipment, portable controllers, and communication devices. Unlike the more aggressive solvent-based systems, it is safe-to-use even on the most delicate plastic enclosures. Where greater work safety and comfort are desired, the 841WB reduces or eliminates strong workplace odors and high flammable vapor levels.

It is also good for trace repair and home electronics hobbies.

Benefits and Features

- **Provides effective EMI/RFI shielding over a broad range of frequencies**
- **Can be applied by spray gun, roller, or brush**
- **One-part, ready-to-use system—no dilution required**
- **Excellent adhesion to drywall and plastics**
- **Can be painted over with common architectural paints**
- **Safe on the most delicate plastics**
- **Good environmental resistance**
- **Non-flammable**
- **Low toxicity**
- **No noxious odor**
- **Ships as Non-DG by Air**
- **Cures at room temperature**
- **Low Regulated VOC content of 59.6 g/L**

ENVIRONMENT

RoHS Compliant
Low-VOC



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Curing & Work Schedule

<i>Properties</i>	<i>Value</i>
Dry to Touch (liquid)	30 min
Recoat time (brush)	1 h
Recoat time (spray)	30 min
Full Cure (at room temp.)	24 h
Full Cure (at 65 °C)	3 h
Shelf Life	To be determined
Storage Temperature Limits	5 to +40 °C [+41 to +104°F]

a) Assumes no let down was performed.

ATTENTION! Do NOT freeze. The product gels irreversibly below 0 °C [32 °F]

Service Ranges

<i>Properties</i>	<i>Value</i>
Constant Service Temperature	-40 to +120 °C [-40 to +248 °F]
Maximum Coverage per liter ^{c)}	<52 000 cm ² [<56 ft ²]
Maximum Coverage per U.S. Gallon ^{c)}	<198 000 cm ² [<213 ft ²]

c) Idealized estimate based on a coat thickness of 51 µm [2.0 mil] and 100% transfer efficiency.

Properties of Uncured 841WB

<i>Physical Property</i>	<i>Mixture</i>
Color	Dark grey
Viscosity @25 °C [77 °F] ^{a)}	250 cP ± 50 cP [0.25 Pa·s ± 0.05 Pa·s]
Density @25 °C [77 °F]	1.76 g/mL
Solids Percentage (wt/wt) ^{b)}	58%
Flash Point	None
Odor	Musty

a) Brookfield viscometer at 30 RPM with spindle LV4



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Properties of Cured 841WB

<i>Electric Properties</i>	<i>Method</i>	<i>Value</i>
Volume Resistivity	Method 5011.5 in MIL-STD-883H	<i>Resistance</i> ^{a)} <i>Conductance</i> ^{a)} 0.012 Ω·cm 82 S/cm
Surface Resistivity @7.8 mil	Calculated	≤0.76 Ω/sq 1.3 S
Magnetic Class		Ferromagnetic (magnetic)
Relative Permeability		≥100
Shielding Attenuation ^{b)} for 50 μm [2 mil]	IEEE STD 299-1997	
10 to 100 kHz	"	84 dB to 89 dB
>100 kHz to 1 MHz	"	55 dB to 87 dB
>1 MHz to 10 MHz	"	26 dB to 50 dB
>10 MHz to 100 MHz	"	19 dB to 39 dB
>100 MHz to 1 GHz	"	37 dB to 47 dB
>1 GHz to 10 GHz	"	36 dB to 47 dB
>10 GHz to 18 GHz	"	35 dB to 45 dB
<i>Physical Properties</i>	<i>Method</i>	<i>Value</i>
Paint Type	—	Aliphatic polyurethane (Thermoset)
Color	Visual	Grey
Abrasion Resistant	—	Yes
Blister Resistant	—	Yes
Peeling Resistant	—	Yes
Water and Salt Spray Resistant	—	Yes

Note: One coat thickness is typically around 38 μm [1.5 mil]. TBD = To be determined.

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

b) Shield attenuation (with respect to a reference sample without shield isolation) is given for adjacent frequency ranges and provides the minimal and maximal value registered within these ranges.

<i>Environmental & Ageing Study</i>	<i>Method</i>	<i>Value</i>
Salt Spray Test: 7 day @35 °C +Salt/Fog	ASTM B117-2011	TBD
Cross-Hatch Adhesion	ASTM D3359-2009	"
Cracking, unwashed area	ASTM D661-93	"
Visual Color, unwashed area	ASTM D1729-96	"
Peeling, unwashed area	ASTM D1729-96	TBD

Note: TBD = to be determined.

a) Tested by an external and independent laboratory using four point probe

The coating attenuation is plotted in Figure 1.

Shielding Attenuation

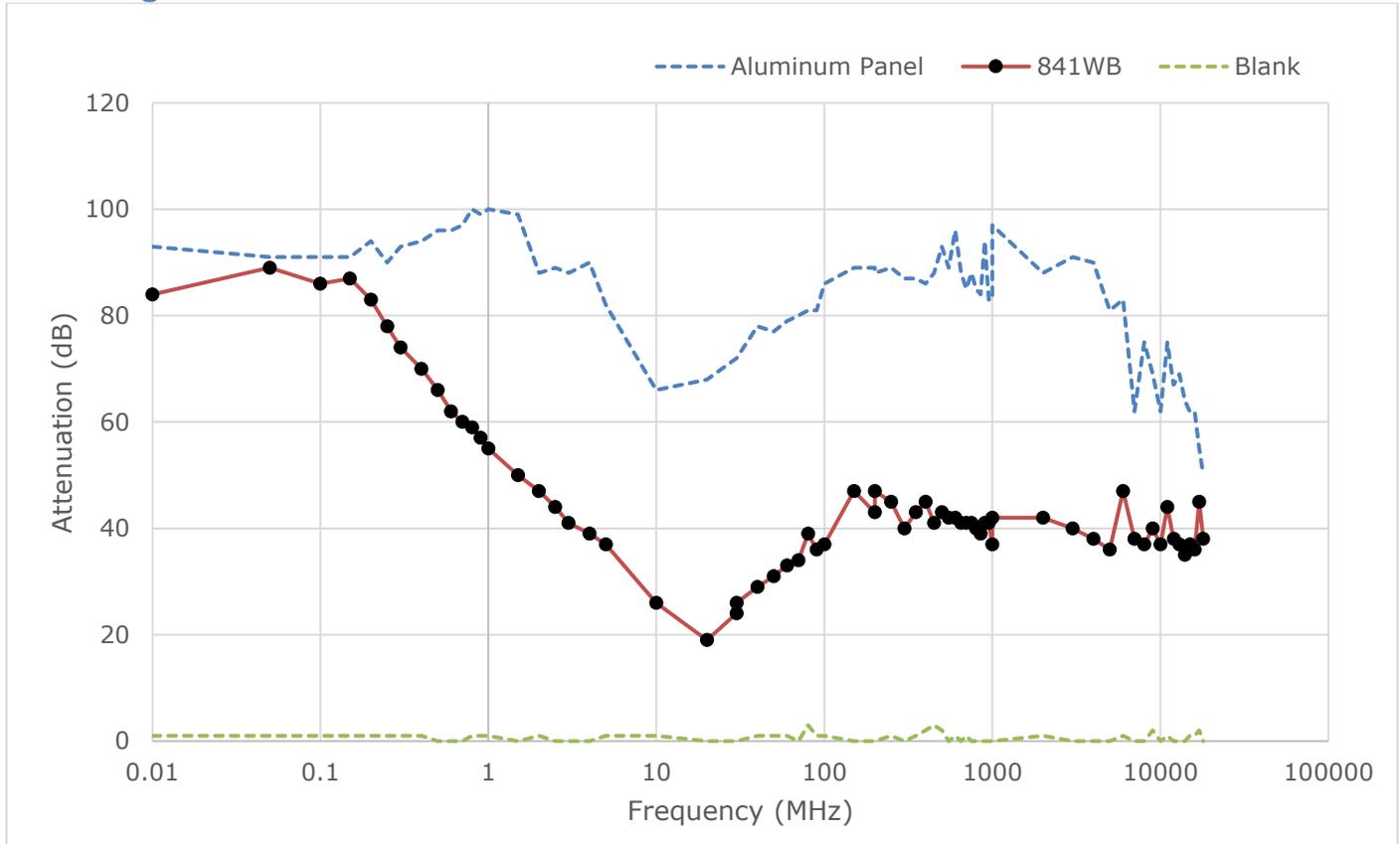


Figure 1. Attenuation of 841WB coating at different frequencies

Compatibility

Chemical—Nickel has good resistance to oxidation in a variety of corrosive environments, including marine environments. In normal atmosphere or freshwater, nickel typically corrodes less than 0.0025 mm per year. Since nickel forms a passive protective film on its surface that slows down or stops further corrosion, the passive nickel resists corrosion better than pure copper fillers. In addition, nickel is harder than its silver or copper filled counterparts, helping provide greater durability.

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 offers great repair and rework characteristics.

Adhesion—The 841WB coating adheres to typical drywall coatings including latex paints and other water based polyurethanes, and may be painted over with such paints as well.

Storage

Store between 5 °C and 40 °C [41 °F and 104 °F] in dry area.

ATTENTION! Do NOT freeze. The product gels irreversibly below 0 °C [32 °F]

Health, Safety, and Environmental Awareness

Please see the 841WB **Safety Data Sheet** (SDS) for greater details on transportation, storage, handling and other security guidelines.

Environmental Impact: The regulated volatile organic content (VOC) is 59.6 g/L. And the actual VOC is 35.2 g/L.

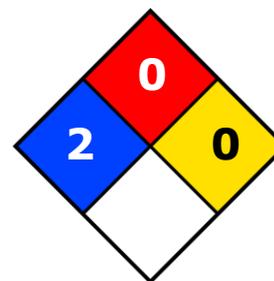
Health and Safety: The solvent system is mostly water with about 3% organic solvent, so the solvent system is quite safe.

Nickel can cause skin allergies and damage to lungs after long term exposure. IARC has classified nickel as a suspected carcinogen. Wear safety glasses or goggles and disposable gloves to avoid exposures. Do not ingest or inhale.

HMIS® RATING

HEALTH:	* 2
FLAMMABILITY:	0
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)

Application Instructions

The 841WB Super Shield can be easily applied by the paintbrush or spray gun.

NOTE: In all cases, the mixture should be kept slightly agitated during use to avoid premature settling of the solids.

For best results, apply many thin coats as opposed to using fewer thick coats. We recommend a coat with a dry film thickness of roughly 2 mil [51 µm]. Follow the procedure below for ensure optimal conductivity.



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Equipment and Supplies

- Mixing spatula
- Clean paint brush & an agitated paint container **OR** HPLV spray gun with agitator cup
- Water and cleaning rags
- Personal protection equipment (See 841WB-Liquid SDS)

Preparation

Clean and dry the surface of the substrate to remove oil, dust, water, solvents, and other contaminants.

To prepare 841WB mixture

- Mix thoroughly and pour into a clean, spray gun cup with agitator or a paint container with agitator.

Spray Gun Application Instructions

Read the procedure below fully and make necessary adjustments to get the required coat thickness for your needs. Typically, one coat results in a dry film thickness of roughly 2 mil [51 µm].

Spray Equipment

Use a HVLP (high-volume low pressure) spray gun using the initial settings described in the following table. Adjust these settings and recommendations as required.

Initial Setting Recommendations

Air Cap	#3 HVLP		
Pressure	<i>Inlet</i> 23 PSI	<i>Air Flow</i> ^{b)} 13.5 SCFM	<i>Air Cap</i> 10 PSI
Fluid Tip	1.3 mm	(1.5 mm) ^{a)}	

Note: These recommendations are based on a DeVilbiss FinishLine paint gun, and may differ with other brands. Please consult your spray gun manufacturer's guide.

a) If no or reduced let down is performed, this may be a better tip choice.

b) SCFM = standard cubic foot per minute

To apply the required thickness by weight

1. Mix paint thoroughly with a spatula or with mechanized paint mixer.
2. Spray a test pattern. This step ensures good flow quality and helps establish appropriate distance to avoid runs.
3. At a distance of 23 to 30 cm (9 to 12 inches), spray a thin and 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. Wait 30 minutes and spray another coat.
5. Apply additional coats until desired thickness is achieved. (Go to Step 3)
6. Let dry at room temperature.

NOTE: Swirling the paint gun container slightly while waiting prevents settling.



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ATTENTION!

- Coats that are applied too thick cause runs and hampers solvent evaporation. Prefer the application of many mist coats rather than fewer thicker wet coats.

To cure at Room temperature

- Let air dry 24 hours

To accelerate cure by heat

- After flash off, put in oven or under heat lamp at ≤ 65 °C for 3 hours.

NOTE: Coats that are very thick require more time to dry.

Packaging and Supporting Products

<i>Cat. No.</i>	<i>Form</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Shipping Weight</i>	
841WB-15ML	Liquid	15 mL	0.5 fl oz	26 g	0.8 oz	TBD	TBD
841WB-150ML	Liquid	150 mL	5.0 fl oz	0.26 kg	0.58 lb	"	"
841WB-850ML	Liquid	0.85 L	28.7 fl oz	1.4 kg	3.3 lb	"	"
841WB-3.78L	Liquid	3.78 L	127 fl oz	6.6 kg	14 lb	"	"

Note: TBD = To be determined.

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

Phone: 1-800-340-0772 (Canada, Mexico & USA)
1-905-331-1396 (International)

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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.

Disclaimer

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