

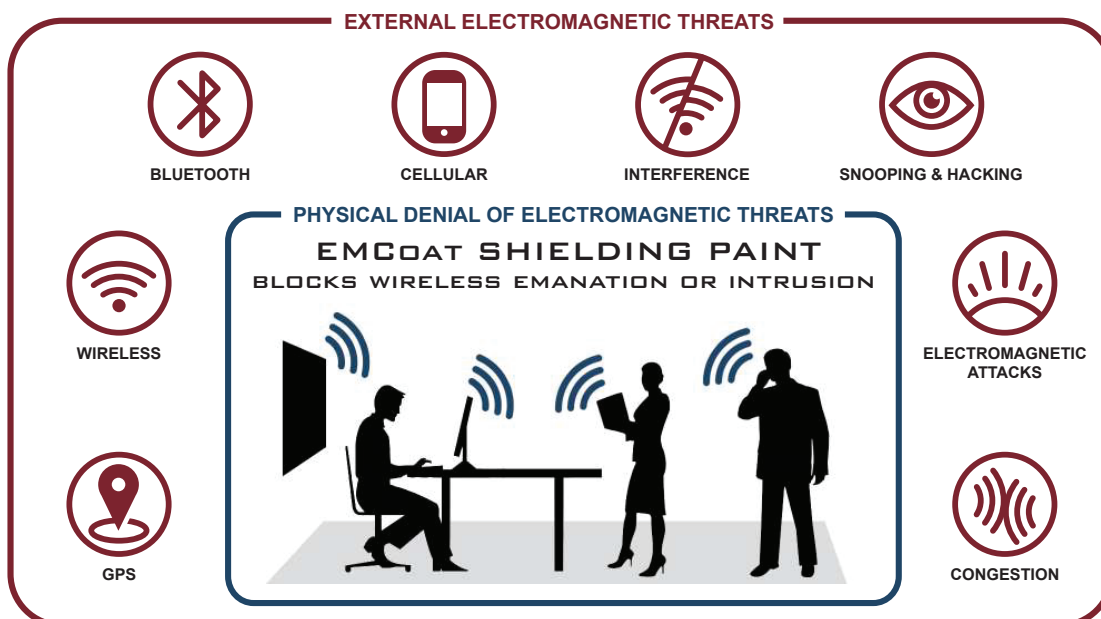


## EMCOAT SHIELDING PAINT

### CONDUCTIVE COATING FOR ELECTROMAGNETIC SHIELDING

EMCoat is a multipurpose, electrically conductive paint that shields sensitive electronics, wireless networks, and secure communications from hacking, snooping, and spectrum congestion. Fast drying, non-toxic, and water soluble, EMCoat is well suited for interior use and is applied with standard painting equipment and can be over coated with paint or other architectural finishes. Provides a wide range of broadband shielding for the aerospace, medical, electronics, entertainment, and recording industries. Ideal for electromagnetic protection in conference rooms, data centers, sensitive medical device rooms, and any area where signal control is a concern.

- Water-based, easy cleanup, non-toxic
- Saves time and money over metal or foils
- Fast and easy to install by roll, spray or brush
- Covers up to 140 ft<sup>2</sup> per gallon
- Standard flat grey finish
- Ideal for a wide range of surfaces



## EMCoAT-4PA067 TECHNICAL INFO

**WHERE:** For interior use on primed drywall, wood, metal or concrete surfaces. Can be overcoated with standard architectural finishes.

**SURFACE PREPARATION:** Surfaces should be free of dirt, oil, loose paint, construction debris and other foreign matter. Scuff sand glossy substrates and/or existing paint layers. Surfaces should be primed with compatible primers suitable for adherence to the substrate (latex primers on drywall, self etching primer on metal or concrete, etc). Proper preparation and installation is critical to overall product performance. Caulk or fill all gaps and holes and apply product liberally in corners, as even small voids or inconsistencies in the coating thickness will reduce shielding effectiveness. For large gaps, EMCaulk shielding caulk is recommended for best performance.

**COVERAGE:** 100-140 ft<sup>2</sup> per gallon when applied in two coats, depending on surface porosity. Higher shielding levels can be obtained with additional coats.

**APPLICATION TEMPERATURE:** Do not apply EMCoat in temperatures below 50°F and relative humidity above 85%. Air circulation can have a strong effect on drying times and recoat times. Any measure to reduce humidity and improve circulation in the application space will lead to shorter application times and dry times with improved performance results. Run dehumidifiers, fans, air conditioning, or other measures as possible during installation and before testing. In high humidity situations use multiple thin coats help reduce drips and runs.

**THINNING:** Do not thin or dilute.

**APPLICATION INSTRUCTIONS:** EMCoat is a high performance, high viscosity coating product with specific application instructions that must be carefully and completely followed. It is recommended that EMCoat be sprayed with commercial quality airless equipment, but it can also be brushed, or rolled. Settling of the conductive components is normal. Mix thoroughly to a uniform consistency immediately before use. Shaking is not adequate and use of a drill and impeller or other mechanical means will be necessary. Recommended mixing paddles should use straight vane construction with a square or rectangular head with rounded corners (such as mixing paddles for joint compound or grout). Helical style paddles are not recommended. Start slowly and mix carefully. If the material is mixed too aggressively it can lead to excess material losses or spilled buckets. It can take up to 15-20 minutes to initially mix a large pail. Take care to scrape all material from the bottom and corners of the container before beginning to use the product. Re-mix material at least every 10 minutes or use an agitator in the bucket to maintain dispersion of the conductive components. Product should be applied in a minimum of two coats to ensure uniform shielding coverage, with a full uniformly spread initial coat, followed by additional applications. Coats should be wet, full-bodied coats. If the product appears to be going on "dry" then a lower spray pressure or reduced fan width may be necessary. Apply product liberally in corners or over seams. Tight areas may need multiple light coats to ensure adequate coverage and avoid runs. Uniform and complete coverage is essential for product performance. It is recommended that experienced personnel are used for installation. On large jobs, it is best to work as teams with one person applying product and one person preparing and changing pails.

**Spray:** Do not thin product. To avoid clogging of equipment do not allow product to settle inside of hose or pump. Start pressure at 50% of equipment rating and work up. Remove all filters from paint equipment except the main screen on feed tube. Strainers and filters must be 30 mesh or larger. Use a new screen at the start of each job. Recommended tip sizes: HVLP: 2.2 or larger. Airless: 417 or close equivalent.

**Roll:** A high nap roller (3/4") will achieve the highest distribution of conductive particles and ease of application. Use of shorter nap or microfiber rollers is not recommended.

**Brush:** Use a high quality synthetic brush and apply product liberally.

When brushing or rolling EMCoat, apply generously and do not overwork the product. Watch for and avoid high or low concentrations of conductive solids on the painted surface.

**COATS:** Multiple coats will achieve the most consistent coverage and best shielding performance. Apply first coat with 50% overlap and cross coat a second coat and third coat for best results.

**RECOAT TIME:** Re-coat when dry to touch.

**DRY TIME:** Full curing is required to achieve maximum signal attenuation. See notes on application temperatures to help reduce dry times. Allow at least 24 hours before testing product. Additional time may be necessary in high humidity or low temperature conditions.

**CLEAN UP:** Clean immediately after use with soap and warm water. Clean all equipment according to manufacturers specifications.

**DISPOSAL:** Dry product can be disposed of with standard practices for paint products.

**STORAGE:** Store product at room temperature and do not allow to freeze. It is not recommended to store EMCoat products for longer than six months. Product must be remixed immediately prior to application.

### PRECAUTIONS:

- Refer to Product Safety Data Sheet before use
- Not for exterior use.
- Do not sand.
- Not recommended for use as a finished flooring product. EMCoat must be protected by a suitable architectural finish product for floor installations.
- Priming metal with non-conductive coatings can interrupt the electrical connection between the metal and the paint.
- Any connection to or through a shielding layer can have adverse effects upon the efficacy of the shield. Consult a shielding professional for proper installation of fasteners.

**GROUNDING:** Grounding of conductive surfaces may be required by your local electric code. Please consult with a licensed professional electrician.

**BASE:** Water-borne Urethane      **COLOR:** Dark Grey

**TOTAL VOC:** 111 g/L

**VOC:** (less exempt solvents): 290g/L

**DENSITY:** 1452 g/L

**VOLUME:** .88 gal or 4.3 gal per container

**SOLIDS (WT.):** 54% +/- 2%

**SOLIDS (VOL.):** 31% +/- 2%

For complimentary products or consultation to obtain maximum performance of a shielded enclosure, contact Faraday Structures at [sales@FaradayStructures.com](mailto:sales@FaradayStructures.com) or see [www.FaradayStructures.com](http://www.FaradayStructures.com)

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of the Conductive Group. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your company representative to obtain the most current versions of product documentation. The Conductive Group believes this information and test values to be typical, however, the Conductive Group does not assume any liability whatsoever for accuracy or completeness of any information contained in this document. The Conductive Group does not warrant this product with respect to merchantability or suitability for use, including any intellectual property or trade restrictions, which is the sole responsibility of the purchaser and/or end user. Use of products from the Conductive Group requires compliance with the Conductive Group Standard Terms and Conditions. Always refer to materials handling instructions and safety documentation when using this or any other material. Copyright ©2020 Conductive Group, LLC

**LEAD WARNING:** Warning! Removal of pre-existing paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

M-032: 09-01-21

# SHIELDING EFFECTIVENESS OF EMCOAT PAINT

## TECHNICAL BULLETIN

### OVERVIEW

EMCoat 4PA067 is a water-based, electrically conductive architectural coating. EMCoat is developed, manufactured, and sold by Faraday Structures (a division of the Conductive Group). A principle use of this patented formulation is as an electromagnetic shielding coating for internal surfaces, including walls, floors, and ceilings. This technical bulletin presents the shielding effectiveness test results of panels with a standard coating of EMCoat paint.

### PREPARATION

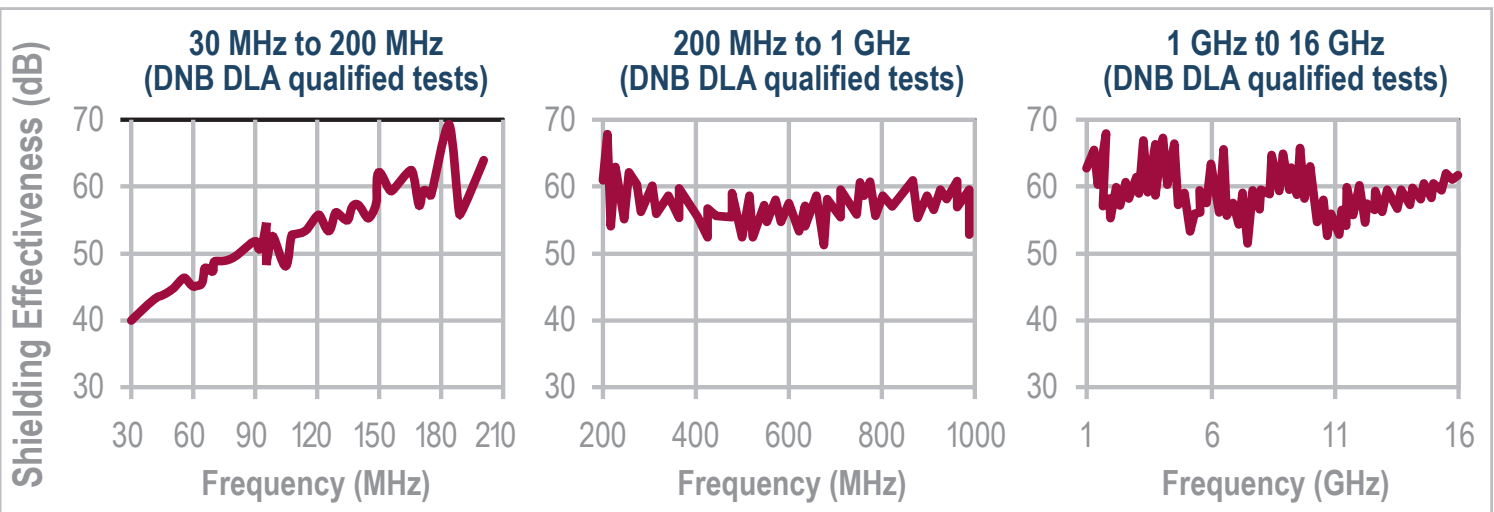
EMCoat paint was applied to primed, flat wall surface panels (24-inch x 24-inch) to a dry film thickness of 0.004 inches, which is the recommended coverage for typical interior surfaces.

### TEST METHODS

Panels were sent to DNB Engineering (Fullerton, CA) for testing from 30 MHz to 1 GHz. DNB Engineering is a DOD Qualified Suitable Laboratory under the Defense Logistics Agency (DLA) Standardization Program. Specifically, DLA has qualified DNB to perform electromagnetic shielding testing under MIL-DTL-38999, requirement paragraph, 3.32, test paragraph 4.5.28, EMI shielding and EIA-364-66, EMI Shielding Effectiveness. The DNB facility consists of a 24 ft x 12 ft x 12 ft welded steel room bisected by a welded steel wall containing a window in which the sample is placed. This dual room steel chamber is essentially free of electromagnetic artifacts and noise.

### RESULTS

Test results show shielding effectiveness of ~55 dB average across the frequencies tested. Shielding of 40 dB at 30 MHz quickly increases to 60 dB by 150 MHz, then ~55 to 60 dB of attenuation through 1 GHz.





## EMCOAT CONDUCTIVE PAINT INSTALLATION & INSPECTION GUIDE

When installed properly, architectural shielding products from Faraday Structures are among the highest performing and most cost-effective electromagnetic shielding products available.

To ensure proper installation and prevent re-work, Faraday Structures recommends proper installation techniques and application quality control processes. The quality control steps described herein can be performed throughout the installation process by anybody that is sufficiently trained in the procedures contained in this guide.

Performing simple quality control steps during installation can provide peace of mind and help to avoid costly re-work.

While there are many factors that determine the overall performance of a shielded room, an indicator of proper installation of our product can be obtained through taking a series of surface resistivity readings across installed surfaces, seams, or other features. If this is done throughout the installation process, it gives on-site installation crews a real-time method to confirm performance and correct any concerns. In addition to the resistivity method described below, simple continuity checks can also be used to verify electrical connection between treated areas and components.

Certification and Acceptance Testing should be done only by an authorized professional, but the quality control steps described herein can be performed throughout the installation process by anybody that is sufficiently trained in the procedures contained in this guide.

### EMCOAT PAINT - INSTALLATION GUIDELINES

EMCoat conductive paint offers a unique combination of electromagnetic shielding capability and ease of application. EMCoat paints can easily be applied where other high-performance shielding materials cannot or where installation would be much more difficult, which makes them uniquely suited for a variety of applications.

Generally stated, a proven way to achieve high performance in electromagnetic shielding projects is to create a complete faraday cage enclosure. This requires attention to design and shielding treatment to all surfaces, entry and exit points, doors, windows, utilities and services, communication lines, or any other point that goes through the shield barrier. While this is not possible in every project or installation, users and installers of shielding products need to understand that there are many variables that affect the shielding performance of a space besides the surface coatings. A properly applied coating as part of a shielded space is only one component in shielding performance, and the actual shielding performance of the space will be a function of the “weakest” area – much as a chain is only as strong as it’s weakest link. Properly applied EMCoat will provide shielding performance to specified levels, thus product installations that are applied per guidelines and meet quality checks provide confidence that the coating is performing as needed.

The installation instruction provided below are identical to those found on EMCoat product labels. Please contact your point of sales or Faraday Structure with any questions or for further guidance.



## EMCOAT PAINT - INSTALLATION GUIDELINES CONT'D

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**STORAGE:** Store product at room temperature and do not allow to freeze. It is not recommended to store EMCoat products for longer than six months. Product must be remixed immediately prior to application.

### PRECAUTIONS:

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**BASE:** Water-borne Urethane

**COLOR:** Dark Grey

**TOTAL VOC:** 111 g/L

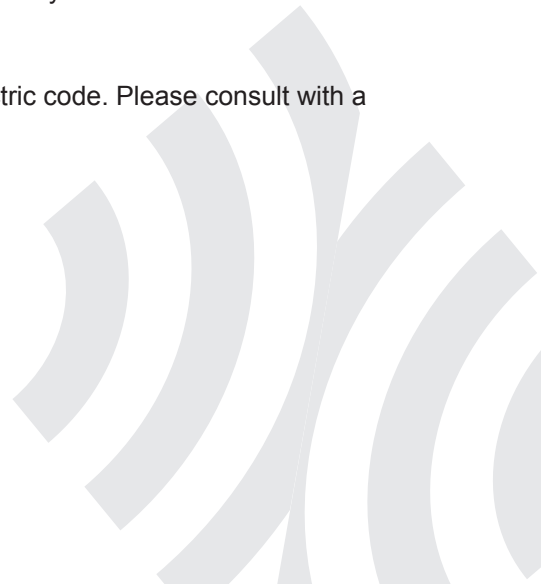
**VOC:** (less exempt solvents): 290g/L

**DENSITY:** 1452 g/L

**VOLUME:** .88 gal or 4.3 gal per container

**SOLIDS (WT.):** 54% +/- 2%

**SOLIDS (VOL.):** 31% +/- 2%



## SURFACE RESISTIVITY INSPECTION

Inspection is a key step in the installation of any architectural shielding product. Installations should always be inspected for any cracks, seams, gaps, or other areas where the shielding product does not create continuous, uniform coverage. The conductivity of both surfaces and seams or other joining features can be tested to ensure that there is sufficient electrical continuity between sheets and other features. This can also indicate areas where products have been improperly applied, which will lead to decreased shielding performance.

The shielding effectiveness of EMCoat paint depends on even and uniform coverage over a surface that the product is applied to. Surface preparation and attention to detail are critical. In addition to proper installation and visual inspection for gaps, surface resistivity checks can help to ensure that the product has been properly applied, with consistent coverage.

With highly conductive architectural shielding product from Faraday Structures, there is a correlation between surface resistivity (measured in ohms-per-square, or ohms/sq) and shielding effectiveness (SE, measured in decibels). Highly conductive surfaces (low resistivity) offer higher shielding performance. While there are many other factors at play in a shielded room (leaks or openings, unfiltered power or data shield penetrations, etc), confirmation that the shielding materials are adequately conductive and well connected can be an indicator of a successful installation and provide confidence that they are shielding as intended. Higher surface resistivity readings (lower conductivity) can indicate flaws in the application of the shielding material. Taking surface resistivity readings throughout the installation process offers an opportunity to confirm performance or correct flaws prior to next steps in a project and full testing.

Surface Resistivity reading must be taken when the surface is fully dried. This can take between a few hours and several days, depending on installation size, temperature, humidity, and most of all circulation. Surface resistivity readings can be an indication of dryness – if the readings are no longer getting significantly lower with time, then the coating is fully dried.

Typical surface resistivity reading averages across an applied surface for a standard 2 coat application of EMCoat should be 0.6 ohm-per-square range or lower, per kelvin probe methods with an SRJ1 ohm-per-square jig (one-inch unit square) as described below. Field verification allows for an opportunity to discover areas of non-uniform application or low conductivity while it is simple to correct. The surface resistivity will go down as multiple layers of paint are added, per the chart below. A surface resistivity characterization kit can be purchased from Faraday Structures (Part Number FS-SRK1).

# OF COATS*	ACCEPTABLE SURFACE RESISTIVITY (OHM/SQUARE)**
1	0.08 or lower
2	0.06 or lower
3	0.05 or lower

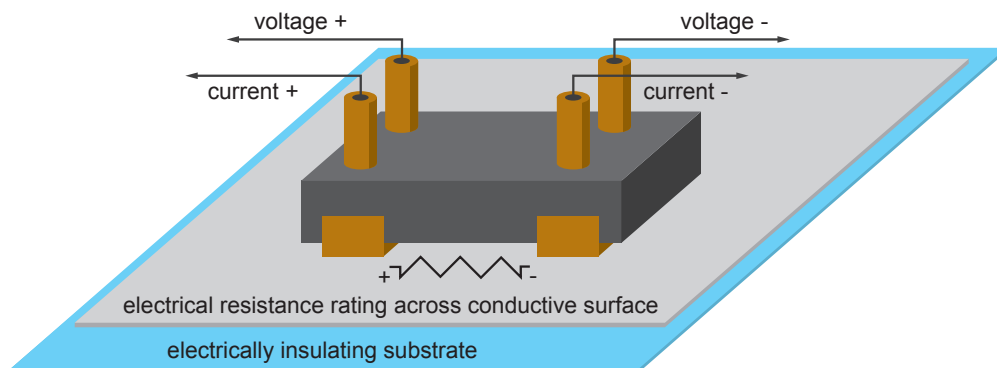
\* it is recommended in all installation that an initial coat consisting of a light surface prep “prime” coat be applied to the surface before any full, uniform coating layers. Additional coats do not require a prep coat. See installation recommendations for more details.

\*\* as installed by approved methods, fully dried, and before overcoating or sealants. With FS-SRK1 surface resistivity jig used in a four wire Kelvin probe configuration. Readings below range are acceptable.

## SURFACE RESISTIVITY READING METHOD

All of the benefits of surface resistivity testing described above can be obtained through a few easy steps. Surface resistivity is measured in ohms/square ( $\Omega/\text{sq}$ ), which is a measurement of the resistance ( $\Omega$ ) over a given distance, normalized throughout an equivalent length section of the material being tested. Milli-ohm meters and the 4-point square jig required to test the surface resistivity can be obtained through Faraday Structures.

1. Adjust the sensitivity reading on the milliohm meter to the  $2\Omega$  setting or lower. This will adjust the decimal placement so that you can see the significant figures required for effective testing.
2. Place the jig on the surface being measured and apply consistent pressure until a stable reading is observed. Rotate the jig slightly to ensure good contact and to check for directionality.
3. Take measurements in all critical areas, such as seams or connection points for penetrations.
4. Take additional measurements at regular intervals on all surfaces (for example, 1 reading per square foot or square meter, depending upon the scale of your project).
5. Document each reading and average the results. If you find isolated spots with inconsistent or high readings, these are the areas that can be addressed by applying supplemental coating over affected areas.



**FIGURE 2: Surface Resistivity Testing with Jig (SRJ1)**



Surface Resistivity  
Jig (SRJ1)



Milli-ohm meter with four  
point Kelvin probe surface  
resistivity configuration



Apply pressure until reading  
stabilizes. The jig can be  
rotated in plane to check  
for directionality

M-033: 4/20/22



**Section 1: Identification**

**Product Name** EMCoat Waterborne Conductive Paint  
**Product Code** 4PA067  
**Manufacturer** Faraday Structures (a division of the Conductive Group)  
 375 West 910 South  
 Heber City, Utah 84032  
[info@conductive.com](mailto:info@conductive.com)  
**Telephone (General)** +1 (435) 654-3683

**Section 2: Hazard(s) Identification**
**Classification of the Substance or Mixture:**

Carcinogenicity – Category 2 (based on polymer base chemistry)  
 Toxic to Reproduction (Unborn child) – Category 1B

**GHS Label Elements:**
**Hazard Pictogram:**

**GHS08: Health Hazard**

**Signal Word:** Danger  
**Hazard Statement:** May damage unborn child  
 Suspected of causing cancer

**Precautionary statements:**

**General:** Read label before use.  
**Prevention:** Use proper “personal protective equipment” (PPE); gloves, eye and face protection, protective clothing. Do not breathe vapor.  
**Response:** If you feel unwell following exposure seek medical attention.  
**Storage:** Store in dry location at temperatures between 50 °F – 90 °F (10 °C – 33 °C).  
**Disposal:** Dispose of contents and container in accordance with all local, regional, national, and international regulations.

**Supplemental label elements:** This product contains chemicals known to the state of California to cause cancer and birth defects or other reproductive harm. Please carefully review the contents of the Safety Data Sheet for additional information.

**Hazards not otherwise classified:** None known.

**Section 3: Composition/Information on Ingredients**

**Substance / mixture:** Mixture.

Ingredient Name	Typical Composition	C.A.S. Number	EINECS Number
Nickel (Ni)	0-50 %	7440-02-0	2311114
1-Methoxy-2-propanol	<2.0	107-98-2	
2-Methoxymethylethoxypropanol	<2.0	34590-94-8	
Propylene Glycol	<2.0	57-55-6	
1-Methyl-2-Pyrrolidone	<2.0	872-50-4	
1,2,4-Trimethylbenzene	<2.0	95-63-6	
Cumene	<0.5	98-82-8	

Based on product and formula knowledge of the manufacturer there are no additional ingredients present which are classified as hazardous to health and thereby are not required to be reported in this section.

#### **Section 4: First-Aid Measures**

- INHALATION:** Remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Qualified personnel may give oxygen if breathing is difficult. Seek medical attention.
- INGESTION:** Rinse mouth with water. Do not induce vomiting. Seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person.
- SKIN:** Remove contaminated clothing, wash affected area with soap and warm water. To avoid further irritation, do not rub or scratch the irritated areas. Seek medical attention if symptoms develop or persist.
- EYES:** Immediately flush eyes with lukewarm water, including under eyelids, for at least 15 minutes. Seek medical attention.
- MOST IMPORTANT SYMPTOMS/EFFECTS, ACUTE AND DELAYED:** May cause skin irritation. See section 11 for more information.

**INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NECESSARY:** In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

#### **Section 5: Fire-Fighting Measures**

- FLAMMABILITY OF THE PRODUCT:** No specific fire or explosion hazard.
- EXTINGUISHING MEDIA:** Use extinguishing agent suitable for surrounding material and type of fire.
- UNSUITABLE EXTINGUISHING MEDIA:** No information available.
- SPECIFIC HAZARDS ARISING FROM THE MATERIAL:** May emit toxic metal oxide fumes under fire conditions.
- SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS:** Use full face, self-contained breathing apparatus and full protective clothing when necessary.

#### **Section 6: Accidental Release Measures**

**PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT, AND EMERGENCY PROCEDURES:** Avoid contact with skin, eyes, or clothing. Wear appropriate NIOSH-approved respirators if collection and disposal of dust is likely. Clean up material and put into a suitable container and dispose in accordance with applicable regulations.

#### **Section 7: Handling and Storage**

**PRECAUTIONS FOR SAFE HANDLING:**

**PROTECTIVE MEASURES:** Wear appropriate personal protective equipment (see Section 8). Avoid exposure to the liquid material during pregnancy. Do not allow contact with eyes or mucous membranes. The dry form of this material contains fibers and is electrically conductive. User generated airborne particulates are electrically conductive and may create electrical short circuits that could result in damage to and malfunction of electrical equipment and/or personal injury.

Store in the original supplied container, with the lid firmly closed, when not in use. Do not store near acids. Store at temperatures between 50 °F – 90 °F (10 °C – 33 °C).

If ventilation alone cannot control exposure to vapor and dust, use respirators approved for the purpose.

Avoid repeated or continuous skin contact. Wear suitable disposable gloves. Wash skin thoroughly after handling.

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored, applied, or processed. After exposure to the material, workers should wash hands and face before eating, drinking, or smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on other hygiene measures.

## Section 8: Exposure Controls/Personal Protection

<b>1-Methoxy-2-propanol</b>	<b>ACGIH TLV (United States, 3/2016)</b>
	TWA: 50 ppm 8 hours.
	TWA: 184 mg/m <sup>3</sup> 8 hours.
	STEL: 100 ppm 15 minutes.
	STEL: 369 mg/m <sup>3</sup> 15 minutes.
<b>2-Methoxymethylethoxypropanol</b>	<b>ACGIH TLV (United States, 3/2016)</b>
<b>Absorbed through skin.</b>	TWA: 100 ppm 8 hours.
	TWA: 606 mg/m <sup>3</sup> 8 hours.
	STEL: 150 ppm 15 minutes.
	STEL: 909 mg/m <sup>3</sup> 15 minutes.
<b>Absorbed through skin.</b>	<b>OSHA PEL (United States, 6/2016)</b>
	TWA: 100 ppm 8 hours.
	TWA: 600 mg/m <sup>3</sup> 8 hours.
<b>Propylene Glycol</b>	<b>AIHA WEEL (United States, 10/2011)</b>
	TWA: 10 mg/m <sup>3</sup> 8 hours.
<b>1-Methyl-2-Pyrrolidone</b>	<b>AIHA WEEL (United States, 10/2011)</b>
<b>Absorbed through skin.</b>	TWA: 10 ppm 8 hours.
<b>1,2,4-Trimethylbenzene</b>	<b>ACGIH TLV (United States, 3/2016)</b>
	TWA: 25 ppm 8 hours.
	TWA: 123 mg/m <sup>3</sup> 8 hours.
<b>Cumene</b>	<b>ACGIH TLV (United States, 3/2016)</b>
<b>Absorbed through skin.</b>	TWA: 50 ppm 8 hours.
	TWA: 245 mg/m <sup>3</sup> 8 hours.

**EYE/FACE PROTECTION:** Avoid eye contact. Wear coverall goggles, as necessary.



## SDS-004 EMCoat Paint

### SAFETY DATA SHEET

**SKIN PROTECTION:** Wear chemical resistant, impervious, disposable gloves to protect hands. Wear protective clothing such as a loose fitting long sleeved shirt that covers the arms and neck, long pants, and shoes that cover the entire foot.

**RESPIRATORY PROTECTION:** Not ordinarily required. If sufficient vapor or fumes are generated during application, use a NIOSH approved organic vapor respirator or a nuisance dust mask.

**VENTILATION:** Use local exhaust sufficient to control vapor, particulates, or dust, to below acceptable exposure limits. If exhaust ventilation is not available or is inadequate, use a NIOSH approved respirator, as appropriate. Discharge from the ventilation system should comply with applicable air pollution control regulations. Electrical systems, in areas where the product is handled, must be suitable for operation in an environment containing electrically conductive dust, fibers or particulate.

**GENERAL HYGIENE RECOMMENDATIONS:** Before eating, drinking, smoking, or using toilet facilities, wash face and hands thoroughly with soap and water. Use vacuum equipment to remove dry product, dust, fibers, or particulate from clothing and work areas. Use of compressed air is not recommended.

## Section 9: Physical and Chemical Properties

Physical state:	Liquid
Color:	Light to medium gray when liquid. Off-white to light gray when dry.
Odor:	Not available
pH:	< 8.5
Viscosity:	N/A
Melting point Ni	1453 °C
Melting point of coating:	n/a
Boiling point Ni	2732 °C
Boiling point of coating	100 °C
Flash Point	Closed cup: >93.3 °C (>199.9 °F)
Evaporation Rate:	<0.8 (butyl acetate = 1)
Flammability:	n/a
Auto-ignition temperature:	n/a
Decomposition temperature:	n/a
Lower explosive limit:	~1.1 %
Upper explosive limit:	~14 %
Vapor pressure:	2.3 kPa (at 20 °C)
Vapor density:	1
Relative density:	n/a
Solubility	n/a
Partition coefficient:	n/a
Viscosity:	not determined
Molecular weight:	not determined

## Section 10: Stability and Reactivity

**Reactivity:** This product is stable.

**Chemical Stability:** This product is stable, however, the nickel present in the formula may react vigorously with acids to liberate hydrogen which can form explosive mixtures with air.

**Possibility of Hazardous Reactions:** Under normal conditions of storage and use, no hazardous reactions are anticipated.

**Conditions to Avoid:** Under special conditions the nickel present in this formula can react with carbon monoxide in reducing atmospheres to form nickel carbonyl,  $\text{Ni}(\text{CO})_4$ , a toxic gas. This is a very unlikely possibility.

**Hazardous Decomposition:** The products of combustion and decomposition depend on other materials present in the fire and the actual conditions of the fire. Burning will produce oxides and other unidentified gases and vapors that may be toxic. Avoid inhalation of decomposition products.

## Section 11: Toxicological Information

Nickel LD50 ORAL RAT >9000 mg/kg

Evidence for the association of nickel compound exposures and cancer risk comes mainly from workers in now obsolete nickel refining operations where very high concentrations of airborne nickel, mostly present as oxidic or sub-sulphidic species at up to  $100 \text{ mg/m}^3$  or more, were associated with excess nasal and lung cancers. The inhalation of nickel powder has not resulted in an increased incidence of malignant lung tumors in rodents. Repeated intratracheal instillation of nickel powder produced an increased incidence of malignant lung tumors in rats. Repeated intratracheal instillation of nickel powder did not produce an increased incidence of malignant lung tumors in hamsters when administered at the maximum tolerated dose. Single intratracheal instillations of nickel powder in hamsters at doses near the LD50 produced an increased incidence of fibrosarcomas, mesotheliomas and rhabdomyosarcomas. Inhalation of nickel powder at concentrations 15 times the TLV irritated the respiratory tract in rodents.

Animal experiments indicate that soluble nickel ingestion causes adverse effects on fetal development at a threshold oral exposure of  $2.2 \text{ mg/ Ni/kg/day}$  by pregnant rats. Data are insufficient to determine if this effect occurs in humans and no regulatory agency has classified soluble forms of nickel as reproductive risks for humans. No soluble nickel is found in this product as formulated.

## Section 12: Ecological Information

No ecological data has been determined on the total product.

## Section 13: Disposal Considerations

Material for disposal should be placed in appropriate sealed containers to avoid potential human and environmental exposure. It is the responsibility of the generator to comply with all federal, state, and local laws and regulations. We recommend that you contact an appropriate waste disposal contractor and environmental agency for relevant laws and regulations. Under the U.S., Resource Conservation and Recovery Act (RCRA), it is the responsibility of the user of the product to determine at the time of disposal, whether the product meets relevant waste classification and to assure proper disposal.

Nickel-containing waste can be collected to recover nickel values. Should nickel recovery be implemented, follow EPA and local regulations.





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The generation of waste should be minimized or avoided wherever possible.

### Section 14: Transport Information

**International Maritime Dangerous Goods Code**

Not regulated.

**International Civil Aviation Organization Technical Instructions for the Carriage of Dangerous Goods by Air**

Not regulated.

**U.S. Dept. of Transportation Regulations**

Not regulated.

**Canadian Transportation of Dangerous Goods Act**

Not regulated.

**European Agreement Concerning the International Carriage of Dangerous Goods by Road**

Not regulated.

### Section 15: Regulatory Information

**TSCA Listed:** Nickel is listed on the TSCA inventory.

**HMIS Ratings:** Health: 1 Flammability: 1 Physical: 0

**SARA Title III:** This product contains metallic nickel which is subject to the reporting requirements of SARA Title III Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372:

**California Prop. 65:** This product contains chemicals known to the state of California to cause cancer and birth defects or other reproductive harm. As indicated in Title 22 of the California Code of Regulations Section 12707(b)(5), for purposes of Proposition 65, nickel and nickel compounds present no significant risk of cancer by the route of ingestion.

Refer to the Composition section (Section 3) of this SDS for appropriate CAS numbers and percent by weight.

### Section 16: Other Information

**Explanation and Disclaimer:** Wherever such words or phrases as "hazardous," "toxic," "carcinogen," etc. appear herein, they are used as defined or described under state employee right-to-know laws, Federal OSHA laws or the direct sources for these laws such as the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), etc. The use of such words or phrases should not be taken to mean that we deem or imply any substance or exposure to be toxic, hazardous or otherwise harmful. Any exposure can only be understood within the entire context of its occurrence, which includes such factors as the substance's characteristics as defined in the SDS, amount and duration of exposures, other chemicals present and preexisting individual differences in response to the exposure.

The data provided in this SDS is based on the information received from our raw material suppliers and other sources believed to be reliable. We are supplying you this data solely in compliance with the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200 and other Federal and state laws as described in Section 15: Regulatory Information. This SDS and the information in it are not to be used for purposes other than compliance with the Federal OSHA Hazard Communication Standard.

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**SAFETY DATA SHEET**

Revision History		
Revision	Effective Date	Summary of Changes
0	2/19/2018	Initial version
1	5/4/2022	Branding Updates