

842AR-P

SILVER CONDUCTIVE PEN

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: 842AR-P**Other Means of Identification:** Silver Conductive Pen**Related Part #** 842AR-P

Recommended Use and Restriction on Use

Use: Electrically conductive coating and EMI/RFI shield**Uses Advised Against:** Not available


Details of Manufacturer or Importer

Manufacturer

MG Chemicals
1210 Corporate Drive
Burlington, Ontario L7L 5R6
CANADA

MG Chemicals (Head Office)
9347-193 Street
Surrey, British Columbia V4N 4E7
CANADA

 +1-800-340-0772
FAX +1-800-340-0773
E-MAIL support@mgchemicals.com
WEB www.mgchemicals.com

 +1-905-331-1396
FAX +1-905-331-2682
E-MAIL info@mgchemicals.com

E-MAIL (Competent Person): sds@mgchemicals.com

Emergency Phone Number

For hazardous material incidents ONLY (leaks, spills, fires, exposures or accidents)
USA or CANADA—Call CHEMTREC at **+1-800-424-9300**




For emergencies involving the transport of dangerous goods; 24/7 service
CANADA—Call CANUTEC collect at **+1-613-996-6666** or ***666** on cellular phones

842AR-P**SILVER CONDUCTIVE PEN****Section 2: Hazard(s) Identification****Classification of Hazardous Chemical****GHS Categories**

| Criteria | | Category | Signal Word | Pictograms |
|--------------------------------------|-----------------|----------|-------------|-------------|
| Flammable Liquid | | 2 | Danger | Flame |
| Eye Irritation | | 2 | Warning | Exclamation |
| Specific Target Organ Toxicity | Single Exposure | 3 | Warning | Exclamation |
| Hazardous to the Aquatic Environment | Chronic | 1 | Warning | Environment |

Note: The degree of severity is ranked within each hazard class from 1 (Highest Severity) to up to 5 (Lowest Severity), which is opposite to HMIS and NFPA conventions. Severity category rankings do not allow comparisons between classes.

Label Elements

| | |
|---|--|
| Signal Word | DANGER |
| Pictograms | Hazard Statements |
|  | H225: Highly flammable liquid and vapor |
|  | H319: Causes serious eye irritation H336: May cause drowsiness or dizziness |
|  | H410: Very toxic to aquatic life with long lasting effects |

Section continued on the next page

842AR-P**SILVER CONDUCTIVE PEN***Continued ...*

| Prevention | Precautionary Statements |
|-----------------------|--|
| P102 | Keep out of reach of children. |
| P210 | Keep away from heat, hot surfaces, sparks, flames, and other ignition sources. No Smoking. |
| P261 + P271 | Avoid breathing vapors. Use only outdoors or in a well-ventilated area. |
| P280 | Wear protective gloves, clothing, eye protection, and face protection. |
| P264 | Wash hands thoroughly after handling. |
| P273 | Avoid release to the environment. |
| Response | Precautionary Statements |
| P370 + P378 | In case of fire: Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish. |
| P303 + P361 + P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. |
| P304 + P340, P312 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTRE or doctor if you feel unwell. |
| P305 + P351 + P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P337 + P313 | If eye irritation persists: Get medical advice or attention. |
| P391 | Collect spillage. |
| Storage | Precautionary Statements |
| P403 + P235 | Store in a well-ventilated place. Keep cool. |
| P405 | Store locked up. |
| Disposal | Precautionary Statements |
| P501 | Dispose of contents and container in accordance to local, regional, national, and international regulations. |

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Hazards Not Otherwise Classified

| Other Criteria | Hazard Statements/Precautionary Statement | Signal Word | Pictograms |
|----------------|---|-------------|-------------|
| Defats skin | Repeated exposure may cause skin dryness or cracking. | <i>None</i> | <i>None</i> |
| Argyria | Long term exposure to silver powder or compounds can lead to an irreversible blue-grey discoloration of the skin. | <i>None</i> | <i>None</i> |

Section 3: Composition/Information on Ingredients

| CAS # | Chemical Name | % (weight) |
|-----------|------------------------------|------------|
| 7440-22-4 | silver | 50% |
| 616-38-6 | dimethyl carbonate | 16% |
| 67-64-1 | acetone | 11% |
| 110-43-0 | heptan-2-one ^{a)} | 10% |
| 108-65-6 | 1-methoxy-2-propanol acetate | 1% |

a) Also known as methyl amyl ketone (MAK)

Section 4: First-Aid Measures

| <i>Exposure Condition</i> | <i>GHS Code/Symptoms/Precautionary Statements</i> |
|-----------------------------|---|
| IF ON SKIN (or hair) | P303 + P361 + P353, P308 + P313, P263 |
| Immediate Symptoms | <i>redness, mild irritation, dry skin</i> |
| Response | Take off immediately all contaminated clothing. Rinse skin with water or shower. |
| IF INHALED | P304 + P340, P312 |
| Immediate Symptoms | <i>cough, drowsiness, dizziness, headaches, nausea, unconsciousness</i> |
| Response | Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTRE or doctor if you feel unwell. |

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842AR-P**SILVER CONDUCTIVE PEN***Continued...*

| | |
|---------------------------|---|
| IF IN EYES | P305 + P351 + P338, P337 + P313 |
| Immediate Symptoms | <i>severe irritation, redness, pain</i> |
| Response | Rinse cautiously with water for 20 minutes or more. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice or attention. |
| IF SWALLOWED | P301 + P330 + P331 |
| Immediate Symptoms | <i>nausea, sore throat, abdominal pain, diarrhea, drowsiness, dizziness</i> |
| Response | Rinse mouth. Do NOT induce vomiting. |

Section 5: Fire-Fighting Measures

| | |
|----------------------------|--|
| Extinguishing Media | In case of fire: Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish. Use water spray to cool containers. |
| Specific Hazards | The vapors are heavier than air and may accumulate in low-lying areas. Vapors may travel long distances and ignite at an ignition source, which can cause a flashback or an explosion. Prevent fire-fighting wash from entering waterway or sewer system. |
| Combustion Products | Produces carbon oxides (CO,CO ₂) and metal oxide fumes. |
| Fire-Fighter | Wear self-contained breathing apparatus and full fire-fighting turn-out gear. |

Section 6: Accidental Release Measures

| | |
|----------------------------------|---|
| Personal Protection | See personal protection recommendations in Section 8. |
| Precautions for Response | Avoid breathing vapors. Remove or keep away all sources of extreme heat or open flames. |
| Environmental Precautions | Avoid releasing to the environment. Prevent spill from entering drains and waterways. |
| Containment Methods | Not applicable |
| Cleaning Methods | Collect liquid in a sealable, solvent-resistant container. Sprinkle inert absorbent compound onto spill, then sweep into the container. Wash spill area with soap and water to remove the last traces of residue. |
| Disposal Methods | Dispose of spill waste according to Section 13. |

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Section 7: Handling and Storage

| | |
|-------------------|--|
| Prevention | <p>Keep out of reach of children.</p> <p>Keep away from heat, hot surfaces, sparks, flames, and other ignition sources. No Smoking.</p> <p>Avoid breathing vapors. Use only outdoors or in a well-ventilated area.</p> <p>Keep container tightly closed.</p> |
| Handling | <p>Wear protective gloves, protective clothing, and eye protection.</p> <p>Wash hands thoroughly after handling.</p> <p>Take off contaminated clothing and wash it before reuse.</p> <p>Avoid release to the environment. Collect spillage.</p> |
| Storage | <p>Store in a well-ventilated place. Keep cool.</p> <p>Store locked up.</p> |

Section 8: Exposure Controls/Personal Protection
Substances with Occupational Exposure Limit Values

| Chemical Name | Country/ Provinces | Long Term Exposure Limits (PEL) | Short Term Exposure Limits (STEL) |
|---|-------------------------------|--|--|
| silver (metal dust, mist) (metal) (Ag and its compounds) (metal, dust, fumes) | ACGIH | 0.1 mg/m ³ | Not established |
| | U.S.A. OSHA PEL | 0.01 mg/m ³ | Not established |
| | Canada AB | 0.1 mg/m ³ | Not established |
| | Canada BC | 0.01 mg/m ³ | 0.03 mg/m ³ |
| | Canada ON | 0.1 mg/m ³ | Not established |
| | Canada QC | 0.1 mg/m ³ | Not established |
| acetone | ACGIH | 500 ppm | 750 ppm |
| | U.S.A. OSHA PEL | 1 000 ppm | Not established |
| | Canada AB | 500 ppm | 750 ppm |
| | Canada BC | 250 ppm | 500 ppm |
| | Canada ON | 500 ppm | 750 ppm |
| | Canada QC | 750 ppm | 1 000 ppm |
| heptan-2-one methyl amyl ketone | ACGIH | 50 ppm | Not established |
| | U.S.A. OSHA PEL | 100 ppm | Not established |
| | Canada AB | 50 ppm | Not established |
| | Canada BC | 50 ppm | Not established |
| | Canada ON | 25 ppm | Not established |
| | Canada QC | 50 ppm | Not established |

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Continued ...

| Chemical Name | Country/ Provinces | Long Term Exposure Limits (PEL) | Short Term Exposure Limits (STEL) |
|---------------------------------|--|---|---|
| 1-methoxy-2-propanol acetate | ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC | Not established 50 ppm Not established 50 ppm 50 ppm Not established | Not established Not established Not established 75 ppm Not established Not established |

Note: Ingredients are listed in descending weight contribution order (from greatest to least). The ACGIH¹, OSHA (Table Z-1), and Canadian provinces exposure limits were consulted. Limits from the RTECS database² and data from suppliers' SDS were also consulted. Short term exposure limits (STEL) are for 15 min and long term permissible exposure limits (PEL) for 8 h.

Engineering Controls**Ventilation**

Keep airborne concentrations below the occupational exposure limits (OEL).

Personal Protective Equipment**Eye protection**

Wear appropriate protective eyeglasses or chemical safety goggles.

RECOMMENDATION: Ensure that glasses have side shields for lateral protection.

Skin Protection

For likely contacts, use of protective butyl rubber or other chemically resistant gloves.

Respiratory Protection

For over-exposures up to 10 x OEL of vapors, wear respirator such as a half-mask respirator with organic vapor cartridges.

Above 10 x OEL, use a positive-pressure, air-supplied respirator or a self-contained breathing apparatus.

RECOMMENDATION: Consult your local safety supply store to ensure your respirator has filter cartridges appropriate for the ingredients listed in section 3 of this SDS, and that the respirator is fitted to the employee by a professional.

Section continued on the next page

842AR-P**SILVER CONDUCTIVE PEN****General Hygiene Considerations**

Wash hands thoroughly with water and soap after handling.

Section 9: Physical and Chemical Properties

| | | | |
|--|--------------------|--|----------------------|
| Physical State | Liquid | Lower Flammability Limit ^{b)} | 2% |
| Appearance | Light gray | Upper Flammability Limit ^{b)} | 13% |
| Odor | Acetone-like | Vapor Pressure ^{b)} @20 °C | 11 kPa [86 mmHg] |
| Odor Threshold ^{a)} | 5 ppm | Vapor Density | ≥2 (Air =1) |
| pH | Not available | Relative Density @25 °C | 1.7 |
| Freezing/Melting Point | Not available | Solubility in Water | Partially miscible |
| Initial Boiling Point ^{a)} | 56 °C [132 °F] | Partition Coefficient n-octanol/water | Not available |
| Flash Point ^{a)} | -17 °C [1.4 °F] | Auto-ignition Temperature ^{c)} | ≥315 °C [≥599 °F] |
| Evaporation Rate | Fast | Decomposition Temperature | Not available |
| Flammability | Highly Flammable | Viscosity @25 °C | 873 cP |

a) Values based on acetone component.

b) Lower and Upper Explosive Limits, and vapor pressure of mixture calculated using Le Chatelier principle and component physical values.

c) The auto-ignition value is based on 1-methoxy-2-propanol acetate, which is the component with the lowest value.

842AR-P**SILVER CONDUCTIVE PEN****Section 10: Stability and Reactivity**

| | |
|----------------------------|--|
| Reactivity | Not available |
| Chemical Stability | Chemically stable at normal temperatures and pressures |
| Conditions to Avoid | Ignition sources, open flames, excessive heat, and incompatible substances |
| Incompatibilities | Oxidizing agents, strong acids, peroxides, acetylenic compounds |
| Polymerization | Will not occur |
| Decomposition | Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5. |

Section 11: Toxicological Information**Summary of Effects and Symptoms by Routes of Exposure**

| | |
|-------------------|--|
| Eyes | Causes redness, severe irritation, and pain. |
| Inhalation | May cause cough, drowsiness, dizziness, headaches, nausea, or unconsciousness. |
| Ingestion | May cause nausea, sore throat, abdominal pain, and diarrhea (also see inhalation symptoms). |
| Skin | Causes skin redness, mild irritation, and dry skin. |
| Chronic | Prolonged or repeated exposure may cause skin dryness, cracking, as well as defatting the skin. Exposure to silver powder may also cause argyria, an irreversible blue-grey discoloration of the skin. |

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842AR-P**SILVER CONDUCTIVE PEN****Acute Toxicity (Lethal Exposure Concentrations)**

| Chemical Name | LD50 oral | LD50 dermal | LC50 inhalation |
|------------------------------|--------------------------|----------------------------------|--|
| acetone | 5 800 mg/kg Rat | 20 mL/kg Rabbit ^{a)} | 16 000 ppm 4 h Rat ^{a)} |
| silver | >2 000 mg/kg Rat | >2 000 mg/kg Rat | 5.16 mg/m ³ 4 h Rat (dust) |
| dimethyl carbonate | >6.4 g/kg Rat & Mouse | >5 000 mg/kg Rabbit | Not available |
| heptan-2-one | 1 670 mg/kg Rat | 12 600 µL/kg Rabbit | >16.7 mg/kg 4 h Rat (vapor) |
| 1-methoxy-2-propanol acetate | 8 532 mg/kg Rat | >5 g/kg Rabbit | Not available |

Note: Toxicity data from the RTECS² and ECHA databases were consulted. The data from supplier SDS were also consulted.

a) Supplier safety data sheet

Other Toxicological Effects**Skin corrosion/irritation**

Based on available data, the classification criteria are not met.

Serious eye damage/irritation

Acetone is a known serious eye irritant. Contains mechanically abrasive particles.

Sensitization
(allergic reactions)

Based on available data, the classification criteria are not met.

Carcinogenicity
(risk of cancer)

Based on available data, the classification criteria are not met.

Mutagenicity
(risk of heritable genetic effects)

Based on available data, the classification criteria are not met.

Reproductive Toxicity
(risk to sex functions)

Based on available data, the classification criteria are not met.

Teratogenicity
(risk of fetus malformation)

Based on available data, the classification criteria are not met.

STOT-single exposure

Inhalation of acetone, heptan-2-one, and distillates (petroleum), light distillate hydrotreating process, low-boiling may affect the central nervous system.

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842AR-P**SILVER CONDUCTIVE PEN****STOT-repeated exposure**

Based on available data, the classification criteria are not met.

Aspiration hazard

Based on available data, the classification criteria are not met. There is less than 10% category 1 components.

Section 12: Ecological Information

Ecological classifications are based on the IMDG/GHS criteria in conjunction with ecotoxicological data from our suppliers, the European Chemical Agency database (<http://echa.europa.eu>), and other reliable sources.

Contains silver of less than a 1 mm but more than 100 nm (larger than nanoparticles), which release ionic silver levels that are very toxic to the environment. While massive silver and copper are insoluble in water, their powders are considered sufficiently soluble to give rise to an ecological hazard by EU regulators. The classification that follows takes into account to chronic aqueous toxicity of category 1 (M = 10 for silver) of the EU.

Acetone, heptan-2-one, and 1-methoxy-2-propanol acetate are not classifiable as an environmental toxicant (with minimal LC50 of >100 mg/L).

- Acetone has a minimal LC50 96 h of 5 540 mg/L for *Oncorhynchus mykiss* (rainbow trout) and an EC50 48 h of 13 500 mg/L for *Daphnia magna* (water flea).
- Heptan-2-one has a minimal LC50 96 h of 126 mg/L for *Pimephales promelas* (fathead minnow).
- 1-methoxy-2-propanol acetate has a minimal LC50 96 h of ≥ 100 mg/L *Salmo gairdneri* and an EC50 48 h of >500 mg/L for *Daphnia magna* (water flea).

There is insufficient data to classify dimethyl carbonate for aqueous toxicity.

Acute Ecotoxicity

Category 1

Very toxic to aquatic life

Chronic Ecotoxicity

Category 1

Very toxic to aquatic life with long lasting effects

Avoid release to the environment. Collect spillage.

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842AR-P**SILVER CONDUCTIVE PEN****Biodegradability**

Solvent part expected to be biodegradable, but not the polymer or metal filler. The volatile solvent constituents will oxidize rapidly in air by photochemical reaction.

Other Effects

Actual VOC (Volatile Organic Compounds) content according to the US (EPA) and Canadian (CEPA) authorities.

Actual VOC = 12% [200 g/L]; Regulated VOC = 430 g/L

Section 13: Disposal Information

Dispose of contents in accordance with all local, regional, national, and international regulations.

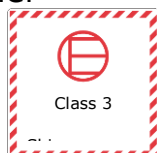
Section 14: Transport Information**Ground**

Refer to TDG regulations (Canadian Transportation of Dangerous Goods regulations);
USA DOT 49 CFR (Parts 100 to 185) **Regulations.**

Sizes 30 mL and under

Excepted Quantity

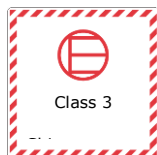
Code **E2**



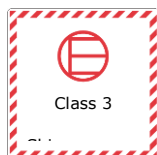
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842AR-P**SILVER CONDUCTIVE PEN****Air****Refer to ICAO-IATA Dangerous Goods Regulations.**

Sizes 30 mL and under

Excepted Quantity
Code **E2**On air waybill, write:
"Dangerous Goods in
Excepted Quantities".*FOR REFERENCE ONLY***UN number:** UN1263
Shipping Name: PAINT
Class: 3
Packing Group: II
Marine Pollutant: No**Sea****Refer to IMDG regulations.**

Sizes 30 mL and under

Excepted Quantity
Code **E2**In transport document,
write:
"Dangerous Goods in
Excepted Quantities".*FOR REFERENCE ONLY***UN number:** UN1263
Shipping Name: PAINT
Class: 3
Packing Group: II
Marine Pollutant: No

Note: Shipper must be appropriately trained and certified before involvement with the transport of dangerous goods.

Section 15: Regulatory Information**Canada****Domestic Substance List (DSL) / Non-Domestic Substance Lists (NDSL)**

All hazardous ingredients are listed on the DSL.

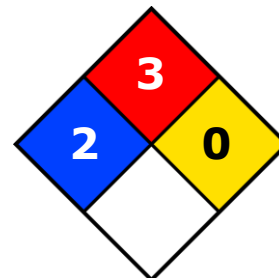
Hazardous Products Act (R.S.C., 1985, c. H-3)

The safety data sheet and label comply with the Hazardous Product Act and WHMIS 2015.

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842AR-P**SILVER CONDUCTIVE PEN****USA****Other Classifications****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)

CAA (Clean Air Act, USA)

This product does not contain any class 1 ozone depleting substances.

This product does not contain any class 2 ozone depleting substances.

This product does not contain products that are listed as hazardous air pollutants.

EPCRA (Emergency Planning and Right to Know Act, USA, 40 CFR 372.45)

This product contains silver (CAS# 7440-22-4; reportable quantity = 1 000 lb), which is subject to the reporting requirements of section 313 Title III of the SARA of 1986 and 40 CFR part 372.

This product contains acetone (CAS# 67-64-1), which is subject to the CERCLA reporting requirements at the 5 000 lb (2 268 kg) threshold.

TSCA (Toxic Substances Control Act of 1976, USA)

All substances are TSCA listed.

California Proposition 65 (Chemicals known to cause cancer or reproductive toxicity, USA)

This product does not contain any substances known to be listed in California.

Europe**RoHS** (Restriction of Hazardous Substances Directive)

This product does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's, PBDE's, DEHP, BBP, DBP, or DIBP and complies with European RoHS regulations.

WEEE (Waste Electrical and Electronic Equipment Directive)

This product is not a piece of electrical or electronics equipment, and is therefore not governed by this regulation.

842AR-P**SILVER CONDUCTIVE PEN****Section 16: Other Information****SDS Prepared by** Regulatory Department**Date of Review** 08 May 2019**Supersedes** 07 November 2018**Reason for Changes:** Color Change in section 9.**Reference**

1) ACGIH 2017 TLVs and BEIs: Based on the documentation of the threshold limit values for chemical substances and physical agents & biological exposure indices, American Conference of Governmental of Industrial Hygienist Cincinnati, OH (2017).

2) All toxicological data were checked against the RTECS (Registry of Toxic Effects of Chemical Substances®)

Abbreviations

| | |
|-------|---|
| ACGIH | American Conference of Governmental Industrial Hygienists (USA) |
| ECHA | European Chemicals Agency |
| EU | European Union |
| EC50 | Half maximal effective concentration |
| EL50 | Half maximal effective loading |
| IARC | International Agency for Research on Cancer |
| NOELR | No observable effect loading ratio |
| NTP | National Toxicology Program |
| GHS | Globally Harmonized System of Classification of Labeling of Chemicals |
| LC50 | Lethal Concentration 50% |
| LCLo | Lowest published lethal concentration |
| LD50 | Lethal Dose 50% |
| OEL | Occupational Exposure Limit |
| PEL | Permissible Exposure Limit |
| SDS | Safety Data Sheet |
| STEL | Short-Term Exposure Limit |
| TCLo | Lowest published toxic concentration |
| TWA | Time Weighted Average |
| VOC | Volatile Organic Content |

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842AR-P**SILVER CONDUCTIVE PEN**

Technical Queries Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions, and FAQs are located at www.mgchemicals.com.

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