842AR-P **SILVER CONDUCTIVE PEN**

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Identifier: 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
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FAX +1-800-340-0773
E-MAIL support@mgchemicals.com
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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 Verisk 3E at ***+1-866-519-4752*** or ***+1-760-476-3962***
(Service access code: 335388)

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

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

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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 and eye 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.

Hazards Not Otherwise Classified

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

Section 3: Composition/Information on Ingredients

CAS #	Chemical Name	% (weight)
7440-22-4	silver	50%
616-38-6	dimethyl carbonate	20%
67-64-1	acetone	10%
110-43-0	heptan-2-one [a)]	9%
108-65-6	1-methoxy-2-propanol acetate	1%

a) Also known as methyl amyl ketone (MAK)

Section 4: First-Aid Measures

Exposure Condition	*GHS Code/Symptoms/Precautionary Statements*
IF ON SKIN (or hair)	P303 + P361 + P353, P308 + P313, P263
Immediate Symptoms	*redness, mild irritation, dry skin*
Response	Take off immediately all contaminated clothing. Rinse skin with water or shower.
IF INHALED	P304 + P340, P312
Immediate Symptoms	*cough, drowsiness, dizziness, headaches, nausea, unconsciousness*
Response	Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTRE or doctor if you feel unwell.
IF IN EYES	P305 + P351 + P338, P337 + P313
Immediate Symptoms	*servere irritation, redness, pain*
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	*nausea, sore throat, abdominal pain, diarrhea, drowsiness, dizziness*
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.

Section 7: Handling and Storage

Prevention

Keep out of reach of children.

Keep away from heat, hot surfaces, sparks, flames, and other ignition sources. No Smoking.

Avoid breathing vapors. Use only outdoors or in a well-ventilated area.

Handling

Wear protective gloves and eye protection.

Wash hands thoroughly after handling.

Take off contaminated clothing and wash it before reuse.

Avoid release to the environment. Collect spillage.

Storage

Store in a well-ventilated place. Keep cool.

Store locked up.

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 U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	0.1 mg/m^3 0.01 mg/m^3 0.1 mg/m^3 0.01 mg/m^3 0.1 mg/m^3 0.1 mg/m^3	Not established Not established Not established 0.03 mg/m^3 Not established Not established
acetone	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	500 ppm 1 000 ppm 500 ppm 250 ppm 500 ppm 750 ppm	750 ppm Not established 750 ppm 500 ppm 750 ppm 1 000 ppm
heptan-2-one *methyl amyl ketone*	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	50 ppm 100 ppm 50 ppm 50 ppm 25 ppm 50 ppm	Not established Not established Not established Not established Not established Not established

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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 ACGIH[1], OSHA (Table Z-1), and Canadian provinces exposure limits were consulted. Limits from the RTECS database[2] 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 that your respirator has a NIOSH (U.S.) approved filter cartridges appropriate for the ingredients listed in Section 3. The respirator should be fitted to the employee by a professional. Ensure vapor cartridges are stored in sealed plastic bags when not being used.

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**	1.75
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]	≥330 °C [≥626 °F]
Evaporation Rate	Fast	**Decomposition Temperature**	Not available
Flammability	Highly Flammable	**Viscosity @25 °C**	>20.5 mm^2/s

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.

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.

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 RTECS[2] and ECHA databases were consulted. The data from supplier SDS were also consulted.

a) Supplier safety data sheet

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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.
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.

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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.

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 = 449 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**  	

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 <u>trained and certified</u> 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.

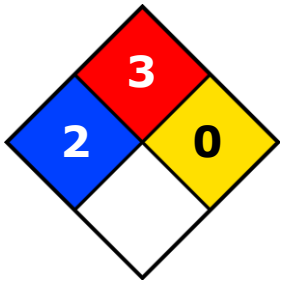
USA

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.

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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.

Section 16: Other Information

SDS Prepared by	MG Chemicals' Regulatory Department
Date of Review	03 March 2020
Supersedes	31 May 2019

Reason for Changes: Update to the emergency phone number information.

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®)

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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

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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