

SAI Global File #004008

Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

842AR-LIQUID

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Super Shield™ Silver Conductive Coating

SDS Code: 842AR-Liquid

Related Part # 842AR-15ML, 842AR-150ML, 842AR-900ML, 842AR-3.78L

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

+1-800-340-0772

FAX +1-800-340-0773

E-MAIL support@mgchemicals.com

WEB www.mgchemicals.com

MG Chemicals (Head Office) 9347-193 Street

Surrey, British Columbia V4N 4E7

CANADA

+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 **☎**: +1-800-424-9300

For emergencies involving dangerous goods; Collect 24/7

CANADA: Call CANUTEC **2**: +1-613-996-6666 or *666 on cellular phones

SAI Global File #004008

842AR-LIQUID

Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

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



Quality System Certified to ISO 9001:2008 SAI Global File #004008

SUPER SHIELDTM SILVER CONDUCTIVE COATING 842AR-LIQUID

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.
P233	Keep container tightly closed.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof equipment.
P243	Take action to prevent static discharges.
P261, P271	Avoid breathing mist/vapors/spray. Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/clothing/eye protection/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/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/attention.
P391	Collect spillage.
Storage	Precautionary Statements
P403 + P235	Store in well-ventilated place. Keep cool.
P405	Store locked up.
Disposal	Precautionary Statements
P501	Dispose of contents/container in accordance to local/regional/internationa regulations.

Section continued on the next page

SAI Global File #004008 Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

842AR-LIQUID

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 bluegrey 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	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

Exposure Condition	GHS Code/Symptoms/Precautionary Statements
IF ON SKIN (or hair)	P303 + P361 + P353, P263
Immediate Symptoms	redness, mild irritation, dry skin
Response	Take off immediately all contaminated clothing. Rinse skin with water or shower.
	Wash contaminated clothing before reuse.
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/doctor if you feel unwell.

Section continued on the next page



SAI Global File #004008

Burlington, Ontario, Canada

Super ShieldTM Silver Conductive Coating

842AR-LIQUID

IF IN EYES	P305 + P351 + P338, P337 + P313
Immediate Symptoms	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/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.

The vapors are heavier than air and may accumulate in low-lying **Specific Hazards**

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.

Produces carbon oxides (CO,CO₂) and metal oxide fumes. **Combustion Products**

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 the mist/spray/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 Contain with inert absorbent (such as soil, sand, vermiculite).

Collect liquid in a sealable, solvent-resistant container. Sprinkle **Cleaning Methods**

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.

SAI Global File #004008 Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

842AR-LIQUID

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 mist/vapors/spray. Use only outdoors or in a well-

ventilated area.

Keep container tightly closed.

Ground and bond container and receiving equipment.

Use explosion-proof equipment.

Take action to prevent static discharges.

Handling Wear protective gloves/clothing/eye protection/face 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 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)	ACGIH U.S.A. OSHA PEL Canada AB	0.1 mg/m ³ 0.01 mg/m ³ 0.1 mg/m ³	Not established Not established Not established
(Ag and its compounds) (metal, dust, fumes)	Canada BC Canada ON Canada QC	0.01 mg/m ³ 0.1 mg/m ³ 0.1 mg/m ³	0.03 mg/m ³ Not established Not established

Section continued on the next page



SAI Global File #004008

842AR-LIQUID

Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

Continued...

Chemical Name	Country/ Provinces	Long Term Exposure Limits (PEL)	Short Term Exposure Limits (STEL)
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
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).

Section continued on the next page



SAI Global File #004008

Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

842AR-LIQUID

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 mist/vapors/spray, 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.

General Hygiene Considerations

Wash hands thoroughly with water and soap after handling.



SAI Global File #004008 Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

842AR-LIQUID

Section 9: Physical and Chemical Properties			
Physical State	Liquid	Lower Flammability Limit ^{b)}	2%
Appearance	Metallic silver	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)
рН	Not available	Specific Gravity @25 °C	1.7
Freezing/Melting Point	Not available	Solubility in Water	Partially miscible
Boiling Point a)	56 °C [132 °F]	Partition Coefficient	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 (solid, gas)	Not available	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.

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.



SAI Global File #004008 Burlington, Ontario, Canada

Super ShieldTM Silver Conductive Coating

842AR-LIQUID

Section 11: Toxicological Information

Routes of Exposure

Inhalation, Eye Contact, Skin Contact, and Ingestion

Symptoms Summary

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	20 mL/kg	16 000 ppm
	Rat	Rabbit ^{a)}	4 h Rat ^{a)}
silver	>2 000 mg/kg	>2 000 mg/kg	5.16 mg/m³
	Rat	Rat	4 h Rat (dust)
dimethyl carbonate	>6.4 g/kg	>5 000 mg/kg	Not
	Rat & Mouse	Rabbit	established
heptan-2-one	1 670 mg/kg	12 600 μL/kg	>16.7 mg/kg
	Rat	Rabbit	4 h Rat (vapor)
1-methoxy-2-propanol acetate	8 532 mg/kg	>5 g/kg	Not
	Rat	Rabbit	established

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

a) Supplier safety data sheet

Section continued on the next page



(allergic reactions)

(risk of fetus malformation)

Quality System Certified to ISO 9001:2008

SAI Global File #004008

Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

842AR-LIQUID

Other Toxicological Effects

Skin corrosion/irritationBased 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 Based on available data, the classification criteria are

not met.

Carcinogenicity Based on available data, the classification criteria are

(risk of cancer) not met.

Mutagenicity Based on available data, the classification criteria are

(risk of heritable genetic effects) not met.

Reproductive Toxicity Based on available data, the classification criteria are

(risk to sex functions) not met.

Teratogenicity Based on available data, the classification criteria are

not met.

STOT-single exposure Inhalation of acetone, heptan-2-one, may affect the

central nervous system.

STOT-repeated exposure Based on available data, the classification criteria are

not met.

Aspiration hazardBased on available data, the classification criteria are

not met. There is less than 10% category 1

components.



SAI Global File #004008

Burlington, Ontario, Canada

Super ShieldTM Silver Conductive Coating

842AR-LIQUID

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 $1 \, (M = 10 \, \text{for silver})$ 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.

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



SAI Global File #004008

842AR-LIQUID

Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

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 5 L and under

Limited Quantity



Sizes greater than 5 L

UN number: UN1263 Shipping Name: PAINT

Class: 3

Packing Group: II Marine Pollutant: Yes



Flash Point -17 °C [1.4 °F]

Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Sizes 0.5 L and under

Limited Quantity Total Net QTY per package 1.0 L



Sizes up to 5 L (passenger), 60 L (cargo)

UN number: UN1263 Shipping Name: PAINT

Class: 3

Packing Group: II Marine Pollutant: Yes



Flash Point -17 °C [1.4 °F]

Section continued on the next page



SAI Global File #004008

Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

842AR-LIQUID

Sea

Refer to IMDG regulations.

Sizes 5 L and under

Limited Quantity



Sizes greater than 5 L

UN number: UN1263 Shipping Name: PAINT

Class: 3

Packing Group: II Marine Pollutant: Yes



Flash Point -17 °C [1.4 °F]

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.

Industry and Science Canada

MG Labels products intended for the workplace to conform to WHMIS labeling regulations. Product identification, net quantity declaration, minimum printing type size heights, and packaging of this product are in compliance.

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)

Section continued on the next page

Page **14** of **16**



SAI Global File #004008

Burlington, Ontario, Canada

Super ShieldTM Silver Conductive Coating

842AR-LIQUID

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, June 06, 2014 revision, 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, or PBDE's, 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 Michel Hachey

Date of Review 07 October 2016

Supersedes 01 September 2016

Reason for Changes: Change to formulation.

Section continued on the next page



SAI Global File #004008

Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

842AR-LIQUID

Reference

1) ACGIH 2013 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 (2013).

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

Technical Queries Contact us regarding any questions, improvement suggestions, or

problems with this product. Application notes, instructions, and FAQs

are located at <u>www.mgchemicals.com</u>.

Email: support@mgchemicals.com

Mailing Addresses Manufacturing & Support Head Office

1210 Corporate Drive 9347–193rd Street

Burlington, Ontario, Canada Surrey, British Columbia, Canada

L7L 5R6 V4N 4E7

Disclaimer This material safety data sheet is provided as an information resource only.

M.G. Chemicals, Ltd. believes the information contained herein is accurate and compiled from reliable sources. It is the responsibility of the user to query and verify any information seeming suspect where doubt on the validity may exist. The buyer assumes all responsibility of using and handling the product in accordance with local, regional, national, and international

regulations.