

SAI Global File #004008

Burlington, Ontario, Canada

SUPER SHIELDTM SILVER CONDUCTIVE COATING

842AR-AEROSOL

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Super Shield™ Silver Conductive Coating

SDS Code: 842AR-Aerosol

Related Part # 842AR-140G, 842AR-340G

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 4

Surrey, British Columbia V4N 4E7 CANADA

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



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Section 2: Hazard(s) Identification

Classification of Hazardous Chemical

GHS Categories

Criteria		Category	Signal Word	Pictograms
Flammable Aerosol		2	Warning	Flame
Gas under pressure		Liquefied gas	Warning	Gas cylinder
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

Label Elements

Signal Word	WARNING
Pictograms	Hazard Statements
	H223: Flammable aerosol
	H280: Contains gas under pressure; may explode if heated
^	H319: Causes serious eye irritation
	H336: May cause drowsiness and dizziness
*	H410: Very toxic to aquatic life with long lasting effects

Section continued on the next page

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^{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.



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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	Avoid breathing mist/vapors/spray.
P271	Use only outdoors or in a well-ventilated area.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.
P280	Wear protective gloves/clothing/eye protection.
P264	Wash hands thoroughly after handling.
P273	Avoid release to the environment.
Response	Precautionary Statements
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.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312	Call a POISON CENTER/doctor if you feel unwell.
Storage	Precautionary Statements
P410 + P412	Protect from sunlight. Do not expose to temperatures exceeding 50 °C [122 °F].
P403	Store in well-ventilated place.
P405	Store locked up.
P391	Collect spillage.
Disposal	Precautionary Statements
P501	Dispose of contents/container in accordance to local/regional/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.	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)
811-97-2	1,1,1,2-tetrafluoroethane	38%
7440-22-4	silver	21%
67-64-1	acetone	10%
67-63-0	propan-2-ol ^{a)}	9%
616-38-6	dimethyl carbonate	5%
123-86-4	n-butyl acetate	5%
110-43-0	heptan-2-one ^{b)}	4%
108-65-6	1-methoxy-2-propanol acetate	1%
68410-97-9	distillates (petroleum), light distillate hydrotreating process, low-boiling	1%

a) Commonly known as isopropyl alcohol (IPA)

Section 4: First-Aid Measures

Exposure Condition	GHS Code/Symptoms/Precautionary Statements
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 CENTER/doctor if you feel unwell.
	Section continued on the next page

b) Commonly known as methyl amyl ketone (MAK)



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IF IN EYES	P305 + P351 + P338, P337 + P313
Immediate Symptoms	redness, severe irritation, pain
Response	Rinse cautiously with water for at least 15 minutes. 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.
IF ON SKIN	P302 + P352
Immediate Symptoms	redness, mild irritation, dry skin
Response	Wash with plenty of water.

Section 5: Fire-Fighting Measures

3	<i>y</i>
Extinguishing Media	Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish.
	Use water spray to cool containers.
Specific Hazards	Aerosols containers may erupt with force at temperatures above 50 °C [122 °F].
	Produces irritating and toxic fumes in fires or in contact with hot surfaces.
	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), metal oxide fumes, halogenated compounds, and hydrogen fluorides.
Fire-Fighter	Wear self-contained breathing apparatus and full fire-fighting turn-out gear.



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Section 6: Accidental Release Measures

Personal Protection See personal protection recommendations in Section 8.

Precautions for

Avoid breathing the mist/spray/vapors. Remove or keep away all

Response

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, open flames and

other ignition sources. No smoking.

Avoid breathing mist/vapors/spray. Use only outdoors or in a

well-ventilated area.

Do not pierce or burn, even after use.

Handling Do not spray on an open flame or other ignition source.

Wear protective gloves/clothing/eye protection.

Wash hands thoroughly after handling.

Avoid release to the environment. Collect spillage.

Storage Protect from sunlight. Do not expose to temperatures exceeding

50 °C [122 °F].

Store in well ventilated place.

Store locked up.



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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)
1,1,1,2-tetrafluoroethane	MG Chemicals ^{a)} ACGIH	1 000 ppm Not established	Not established Not established
	U.S.A. OSHA PEL	Not established	Not established
	Canada	Not established	Not established
silver	ACGIH	0.1 mg/m ³	Not established
(metal dust, mist)	U.S.A. OSHA PEL	0.01 mg/m ³	Not established
(metal)	Canada AB	0.1 mg/m ³	Not established
(Ag and its compounds)	Canada BC	0.01 mg/m ³	0.03 mg/m ³
(metal, dust, fumes)	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
propan-2-ol	ACGIH	200 ppm	400 ppm
	U.S.A. OSHA PEL	400 ppm	Not established
	Canada AB	200 ppm	400 ppm
	Canada BC	200 ppm	400 ppm
	Canada ON	200 ppm	400 ppm
	Canada QC	400 ppm	500 ppm
n-butyl acetate	ACGIH	150 ppm	Not established
	U.S.A. OSHA PEL	150 ppm	Not established
	Canada AB	150 ppm	200 ppm
	Canada BC	20 ppm	200 ppm
	Canada ON	150 ppm	Not established
	Canada QC	150 ppm	200 ppm
heptan-2-one	ACGIH	50 ppm	Not established
methyl amyl ketone	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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Chemical Name	Country/ Provinces	Long Term Exposure Limits (PEL)	Short Term Exposure Limits (STEL)
1-methoxy-2-propanol	ACGIH	Not established	Not established
acetate	U.S.A. OSHA PEL	50 ppm	Not established
	Canada AB	Not established	Not established
Not established	Canada BC	50 ppm	75 ppm
	Canada ON	50 ppm	Not established
	Canada QC	Not established	Not established
distillates, petrol, light dist	ACGIH	1 500 mg/m ³	Not established
hydrotreat process,	U.S.A. OSHA PEL	2 000 mg/m ³	Not established
low-boil.	Canada AB	1 590 mg/m ³	Not established
	Canada BC	1 500 mg/m ³	Not established
	Canada ON	1 500 mg/m ³	Not established
(Naphta VM&P)	Canada QC	1 370 mg/m ³	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 by 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.

a) MG Chemicals recommended limit corresponding to prevalent international threshold values

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.



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Respiratory Protection

For over-exposures up to $10 \times OEL$ 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.

Section 9: Physical and Chemical Properties

Physical State	Liquid, in an aerosol format	Lower Flammability Limit b)	4%
Appearance	Metallic silver	Upper Flammability Limit ^{b)}	20%
Odor	Acetone-like	Vapor Pressure @20 °C ^{c)}	282 kPa [2 119 mmHg]
Odor Threshold a)	5 ppm	Vapor Density	≥2 (Air =1)
рН	Not available	Specific Gravity @25 °C	1.3
Freezing/Melting	Not	Solubility in	Partially miscible
Point	available	Water	
Boiling Point a)	≥56 °C	Partition	Not
	[≥132 °F]	Coefficient	available
Flash Point a)	-17 °C	Auto-ignition	≥315 °C
	[1.4 °F]	Temperature ^{d)}	[≥599 °F]
Evaporation	Fast	Decomposition	Not
Rate		Temperature	available
Flammability	Not	Viscosity	38 cP
(solid, gas)	available	@25 °C	

a) The values for the boiling point and closed cup flash point are based on the acetone component.

b) Lower and Upper Explosive Limits of mixture calculated using Le Chatelier principle and liquid component LFL and UFL limits

c) For liquid component excluding the propellant

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



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Section 10: Stability and Reactivity

Reactivity Not available

Chemical Stability Chemically stable at normal temperatures and pressures

Conditions to Temperatures above 50 °C [122 °F], open flames, and incompatible

Avoid substances

Incompatibilities Oxidizing agents, strong acids, peroxides, alkali or alkali earth metals

Polymerization Will not occur

Decomposition Will not decompose under normal conditions. For thermal

decomposition, see combustion products in Section 5.

Section 11: Toxicological Information

Routes of Exposure

Eye Contact, Ingestion, Inhalation, and Skin Contact

Symptoms Summary

Eyes May cause 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 May cause 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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Acute Toxicity (Lethal Exposure Concentrations)

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Chemical Name	LD50	LD50	LC50
	oral	dermal	inhalation
1,1,1,2-tetrafluoroethane	Not	Not	1 500 g/m³
	established	established	4 h Rat
silver	>2 000 mg/kg	>2 000 mg/kg	5.16 mg/m³
	Rat	Rat	4 h Rat (dust)
acetone	5 800 mg/kg	20 mL/kg	16 000 ppm
	Rat	Rabbit ^{a)}	4 h Rat ^{a)}
propan-2-ol	3 600 mg/kg	12 800 mg/kg	16 000 ppm
	Rat	Rabbit	8 h Rat
dimethyl carbonate	>6.4 g/kg	>5 000 mg/kg	Not
	Rat & Mouse	Rabbit	established
n-butyl acetate	>10 768 mg/kg	>17 600 mg/kg	390 ppm
	Rat	Rabbit	4 h Rat
heptan-2-one	1 670 mg/kg	12 600 μL/kg	>16.7 mg/kg
	Rat	Rabbit	4 h Rat
1-methoxy-2-propanol acetate	8 532 mg/kg	>5 g/kg	Not
	Rat	Rabbit	established
distillates (petrol.), lt dist.	Not	Not	Not
hydrotreat. process, low-boil.	established	established	established

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

Other Toxicological Effects

Skin corrosion/irritation	Based on available data, the classification criteria are not met.
Serious eye damage/irritation	Acetone and propan-2-ol are known serious eye irritants. 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.

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a) Supplier safety data sheet



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

(risk to sex functions)

Teratogenicity Based on available data, the classification criteria are not

(risk of fetus malformation)

STOT-single exposure Inhalation of acetone, propan-2-ol, n-butyl acetate,

> heptan-2-one, and distillates (petroleum), light distillate hydrotreating process, low-boiling may affect the central

nervous system.

Based on available data, the classification criteria are not STOT-repeated exposure

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 are insoluble in water, the powders are considered sufficiently soluble to give rise to an ecological hazard by EU regulators. The classification that follows takes into account to chronic agueous toxicity of category 1 (M = 10 for silver) of the EU.

The "distillates (petroleum), light distillate hydrotreating process, low-boiling" is an chronic category 2 aquatic toxicant with a LC50 96 h of 8.2 mg/L for Oncorhynchus mykiss (rainbow trout) and an EC50 48 h of 4.5 mg/L for Daphnia magna (water flea), and an EC50 96 h of 3.7 mg/L for Pseudokirchneriella subcapitata (green algae).

Acetone, propan-2-ol, 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).
- Propan-2-ol has a minimal LC50 96 h of 9 640 mg/L for Pimephales promelas (fathead minnow); an EC50 24 h of 5 102 mg/L Daphnia magna (water flea); and an EC50 72 h of 2 000 mg/L Desmodesmus subspicatus (green algae).
- Heptan-2-one has a minimal LC50 96 h of 126 mg/L for Pimephales promelas (fathead minnow).
- The 1-methoxy-2-propanol acetate component 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).



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

The n-butyl acetate ingredient is an acute category 3 environmental toxicant (biodegradable, with minimal LC50 of 18 mg/L for fathead minnow).

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 = 21% [260 g/L]

Section 13: Disposal Information

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



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Section 14: Transport Information

Ground

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

Limited Quantity



UN number: UN1950 Shipping Name: AEROSOL,

flammable Class: 2.1

Packing Group: Not applicable

Marine Pollutant: Yes

Flash Point ≥-17 °C [1.4 °F]

Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Limited Quantity See package instruction Y203

Max Net Qty/Pkg



UN number: UN1950 Shipping Name: AEROSOL,

flammable Class: 2.1

Packing Group: Not applicable

Marine Pollutant: Yes



Flash Point ≥-17 °C [1.4 °F]

Sea

30 kg G

Refer to IMDG regulations.

Limited Quantity



UN number: UN1950 Shipping Name: AEROSOL,

flammable Class: 2.1

Packing Group: Not applicable

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.



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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)

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) and propan-2-ol (CAS # 67-63-0), which are 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) and n-butyl acetate (CAS# 123-86-4), which are 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, 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 01 June 2016

Supersedes 02 November 2015

Reason for Changes: Changes to section 2, 11, 12, 15 due to a change in

classification.

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®)



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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.

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.