

SUPER SHIELD™ NICKEL EPOXY CONDUCTIVE COATING **841ER-PART A**

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Super Shield™ Nickel Epoxy Conductive Coating

SDS Code: 841ER-Part A

Related Part # 841ER-1.17L, 841ER-3.25L

Recommended Use and Restriction on Use

Use: Nickel conductive epoxy resin

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

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☎ +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 ☎: **+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
Eye Damage	1	Danger	Corrosion
Flammable Liquid	2	Danger	Flame
Specific Target Organ Toxicity Repeated Exposure Carcinogenicity	1	Danger	Health
	2	Warning	Health
Sensitization Skin	1	Warning	Exclamation
	2	Warning	Exclamation
Specific Target Organ Toxicity Single Exposure	3	Warning	Exclamation
Hazardous to the Aquatic Environment Chronic	3	none	none

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
	H318: Causes serious eye damage
	H225: Highly flammable liquid and vapor
	H372: Causes damage to lungs through prolonged or repeated exposure by inhalation H351: Suspected of causing cancer

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Pictograms	Hazard Statements
	<p>H317: May cause an allergic skin reaction H315: Causes skin irritation H336: May cause dizziness or drowsiness</p>
<p>No Symbol Mandated</p>	<p>H412: Harmful to aquatic life with long lasting effects</p>
Prevention	Precautionary Statements
<p>P201, P202</p>	<p>Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.</p>
<p>P210</p>	<p>Keep away from heat/sparks/open flames/hot surfaces and other ignition sources. No smoking.</p>
<p>P233</p>	<p>Keep container tightly closed.</p>
<p>P240</p>	<p>Ground and bond container and receiving equipment.</p>
<p>P241</p>	<p>Use explosion-proof equipment.</p>
<p>P243</p>	<p>Take action to prevent static discharges.</p>
<p>P260</p>	<p>Do not breathe mist/vapors/spray.</p>
<p>P270</p>	<p>Do not eat, drink or smoke when using this product.</p>
<p>P264</p>	<p>Wash hands thoroughly after handling.</p>
<p>P280</p>	<p>Wear protective gloves/eye protection/face protection/protective clothing.</p>
<p>P272</p>	<p>Contaminated work clothing should not be allowed out of the workplace.</p>
<p>P271</p>	<p>Use only outdoors or in a well-ventilated area.</p>
<p>P273</p>	<p>Avoid release to the environment.</p>
Response	Precautionary Statements
<p>P370 + P378</p>	<p>In case of fire: Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish.</p>
<p>P308 + P313</p>	<p>IF exposed or concerned: Get medical advice/attention.</p>
<p>P314</p>	<p>Get medical advice/attention if you feel unwell.</p>
<p>P304 + P340, P312</p>	<p>IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTRE/doctor if you feel unwell.</p>

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Response	Precautionary Statements
P305 + P351 + P338, P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P303 + P361 + P352	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Wash with plenty of water/shower.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P363	Wash contaminated clothing before reuse.
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/international regulations.

Hazards Not Otherwise Classified

Other Criteria	Hazard Statements/Precautionary Statement	Signal Word	Pictograms
None	None	None	None

Section 3: Composition/Information on Ingredients

CAS #	Chemical Name	%(weight)
7440-02-0	nickel	53%
78-93-3	2-butanone ^{a)}	15%
123-86-4	n-butyl acetate	10%
25068-38-6	bisphenol-A-(epichlorhydrin)	8%
71-36-3	butan-1-ol	7%
14807-96-6	talc (no asbestos fiber)	3%
68609-97-2	alkyl glycidyl ether	2%

a) Also known as methyl ethyl ketone (MEK)

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Section 4: First-Aid Measures

<i>Exposure Condition</i>	<i>GHS Code/Symptoms/Precautionary Statements</i>
IF IN EYES	P305 + P351 + P338, P310
Immediate Symptoms	<i>irritation, redness, pain, burn</i>
Response	Rinse cautiously with water for at least 30 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
IF ON SKIN (or hair)	P303 + P361 + P352, P333 + P313, P363
Immediate Symptoms	<i>redness, irritation, rash, dry skin</i>
Response	Take off immediately all contaminated clothing. Wash with plenty of water or shower. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
IF INHALED	P304 + P340, P312, P308 + P313
Immediate Symptoms	<i>cough, shortness of breath, dizziness, drowsiness, headaches</i>
Response	Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTRE/doctor if you feel unwell. IF exposed or concerned: Get medical advice/attention.
IF SWALLOWED	P301 + P330, P331, P308 + P313
Immediate Symptoms	<i>abdominal pain, nausea, headaches, dizziness, drowsiness, vomiting</i>
Response	Rinse mouth. Do NOT induce vomiting. IF exposed or concerned: Get medical advice/attention.

SUPER SHIELD™ NICKEL EPOXY CONDUCTIVE COATING 841ER-PART A**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	Produces irritating and toxic fumes in fires or in contact with hot surfaces. May produce very toxic nickel carbonyl gas in the presence of carbon monoxide in a reducing atmosphere. 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), nickel oxides fumes, and nitrogen oxides (NO _x).
Fire-Fighter	Wear self-contained breathing apparatus and full fire-fighting turnout gear.

Section 6: Accidental Release Measures

Personal Protection	See personal protection recommendations in Section 8.
Precautions for Response	Do not breathe 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).
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

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

Keep container tightly closed.

Keep away from heat/sparks/open flames/hot surfaces. No smoking. Ground and bond container and receiving equipment. Use explosion-proof equipment. Take action to prevent static discharges.

Do not breathe mist/vapors/spray. Do not eat, drink or smoke when using this product.

Contaminated work clothing should not be allowed out of the workplace.

Avoid release to the environment.

Handling

Wear protective gloves/clothing/eye protection/face protection.

Take off contaminated clothing and wash it before reuse.

Use only outdoors or in a well-ventilated area.

Wash hands thoroughly after handling.

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)
nickel (dust)	ACGIH	1.5 mg/m ³	Not established
	U.S.A. OSHA PEL	1 mg/m ³	Not established
	Canada AB	1.5 mg/m ³	Not established
	Canada BC	0.05 mg/m ³	Not established
	Canada ON	1 mg/m ³	Not established
	Canada QC	1 mg/m ³	Not established

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Chemical Name	Country/ Provinces	Long Term Exposure Limits (PEL)	Short Term Exposure Limits (STEL)
2-butanone	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	200 ppm 200 ppm 200 ppm 50 ppm 200 ppm 150 ppm	300 ppm 300 ppm 300 ppm 100 ppm 300 ppm 300 ppm
n-butyl acetate	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	150 ppm 150 ppm 150 ppm 20 ppm 150 ppm 150 ppm	Not established Not established 200 ppm 200 ppm Not established 200 ppm
butan-1-ol	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	20 ppm 100 ppm 20 ppm 15 ppm 20 ppm 50 ppm (Ceiling)	Not established Not established Not established 30 ppm (Ceiling) Not established Not established
talc (without asbestos fibers)	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	2 mg/m ³ 20 mppcf ^{a)} 2 mg/m ³ 2 mg/m ³ 2 mg/m ³ 3 mg/m ³	Not established Not established Not established Not established 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 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) Millions of particles per cubic foot air, based on impinge samples counted by light-field technique.

Engineering Controls

Ventilation

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

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SUPER SHIELD™ NICKEL EPOXY CONDUCTIVE COATING 841ER-PART A**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.

For incidental contacts, use disposable natural 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 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.

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Section 9: Physical and Chemical Properties

Physical State	Liquid	Lower Flammability Limit ^{b)}	1.7%
Appearance	Grey	Upper Flammability Limit ^{b)}	11%
Odor	Alcohol-like	Vapor Pressure @20 °C	Not available
Odor Threshold	0.007 ppm	Vapor Density	>4 (Air =1)
pH	Not available	Specific Gravity @25 °C	1.8
Freezing/Melting Point	Not available	Solubility in Water	Partially miscible
Boiling Point ^{a)}	≥80 °C [≥176 °F]	Partition Coefficient	Not available
Flash Point ^{a)}	-9 °C [16 °F]	Auto-ignition Temperature	Not available
Evaporation Rate	Not available	Decomposition Temperature	Not available
Flammability (solid, gas)	Not available	Viscosity @25°C	200 mm ² /s

a) Based on 2-butanone component

b) Values calculated using Raoult's Law and Le Chatelier principle for solvent components.

Section 10: Stability and Reactivity

Reactivity	<p>The nickel can react vigorously with acids and liberate hydrogen, which can form an explosive mixture in air.</p> <p>Nickel may react with carbon monoxide in a reducing atmosphere to form a very toxic nickel carbonyl gas.</p>
Chemical Stability	Chemically stable at normal temperatures and pressures.
Conditions to Avoid	Ignition sources, open flames, excessive heat, and incompatible substances
Incompatibilities	Strong oxidizing agents, strong acids, strong bases
Polymerization	Will not occur
Decomposition	Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5.

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Section 11: Toxicological Information
Routes of Exposure

Eye contact, Ingestion, Inhalation, and Skin contact

Symptoms Summary

Eyes	Causes severe irritation, redness, pain, or burns.
Skin	Causes skin irritation, redness, rash, or dry skin.
Inhalation	May cause cough, shortness of breath, dizziness, drowsiness, or headaches.
Ingestion	May cause nausea, sore throat, abdominal pain, and diarrhea (also see inhalation symptoms).
Chronic	Chronic inhalation exposure to nickel dust or mist may damage lungs.

Acute Toxicity (Lethal Exposure Concentrations)

Chemical Name	LD50 oral	LD50 dermal	LC50 inhalation
nickel	5 000 mg/kg Rat	Not available	Not available
2-butanone	2 737 mg/Kg Rat	6 480 mg/Kg Rabbit	23.5 mg/L 8 h Rat
n-butyl acetate	>10 768 mg/kg Rat	>17 600 mg/kg Rabbit	390 ppm 4 h Rat
bisphenol-A-(epichlorhydrin)	11 400 mg/kg Rat	100 pph 7 h Rabbit	Not available
butan-1-ol	790 mg/kg Rat	3 400 mg/kg Rabbit	Not available
talc	Not available	Not available	Not available
alkyl glycidyl ether	19 200 mg/kg Rat	4 500 mg/kg Rat	Not available

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

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SUPER SHIELD™ NICKEL EPOXY CONDUCTIVE COATING 841ER-PART A**Other Toxicological Effects**

Skin corrosion/irritation	Bisphenol-A, butan-1-ol, and alkyl glycidyl ether are known skin irritants.
Serious eye damage/irritation	The 7% butan-1-ol in the mixture is expected to cause severe eye irritation or irreversible eye damage.
Sensitization (allergic reactions)	Exposure to the epoxy resin and nickel may cause an allergic skin reaction.
Carcinogenicity (risk of cancer)	Nickel is classified as a suspect carcinogen based on animal intratracheal instillation (intubation) or interperitoneal (in body cavity) injection studies. A reliable 2008 study by Oller et al. shows no carcinogenicity for the nickel metal via normal inhalation route. Nickel [7440-02-0] IARC Group 2B: Possibly carcinogenic to humans ACGIH A5: Not suspected as a human carcinogen CA Prop 65: Listed as a carcinogen NTP: Reasonably anticipated to be human carcinogen
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	The 2-butanone, N-butyl acetate and butan-1-ol can affect the central nervous system by inhalation causing drowsiness or dizziness, and they are a respiratory system irritant.
STOT-repeated exposure	Inhalation dust/mist containing nickel particles of less than 0.1 mm may cause chronic inflammation, lung fibrosis, and accumulation of the nickel particles.
Aspiration hazard	Based on available data, the classification criteria are not met. It has a kinematic viscosity >20.5 mm ² /s.

SUPER SHIELD™ NICKEL EPOXY CONDUCTIVE COATING 841ER-PART A**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 nickel of less than a 1 mm but more than 100 nm (larger than nanoparticles), which release ionic silver levels that are harmful to the environment. While massive nickel is insoluble in water, its powder is 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 3 assignment of the EU.

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

In Europe, similar the epoxy resins with CAS# 25068-38-6 and MW <700 is generally classified as chronic category 2 marine pollutant. It generally has LC50 96 h of >1 mg/L but ≤10 mg/L.

Butan-1-ol and 2-butanone are not classifiable as an environmental toxicants (with minimal LC50 of >100 mg/L).

- Butan-1-ol has a minimal LC50 96 h of 1 840 mg/L for Pimephales promelas (fathead minnow); and LC40 48 h of 44 mg/L, EC50 72 h of 648 mg/L Daphnia magna (water flea).
- The 2-butanone has minimal LC50 of 3 130 mg/L 96 h for Pimephales promelas (fathead minnow); EC50 24 h 5 102 mg/L 24 h Daphnia magna (water flea).

Acute Ecotoxicity

Category 3

Harmful to aquatic life

Chronic Ecotoxicity

Category 3

Harmful to aquatic life with long lasting effects

Avoid release to the environment.

Biodegradability

Not readily biodegradable

Other Effects

VOC (Regulated Volatile Organic Content) = 42% [753 g/L]

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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 CFR 49 Regulations (Parts 100 to 185).

Sizes 5 L and under

Limited Quantity



Sizes greater than 5 L

UN number: UN1263
Shipping Name: PAINT
Class: 3
Packing Group: III
Marine Pollutant: No



Flash Point -9 °C [16 °F]

Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Sizes 5 L and under

Limited Quantity

Total net per
Package 10 L



Sizes up to 10 L (passenger), 60 L (cargo)

UN number: UN1263
Shipping Name: PAINT
Class: 3
Packing Group: III
Marine Pollutant: No



Flash Point -9 °C [16 °F]

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SUPER SHIELD™ NICKEL EPOXY CONDUCTIVE COATING 841ER-PART A

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: III
Marine Pollutant: No



Flash Point -9 °C [16 °F]

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/NDSL.

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.

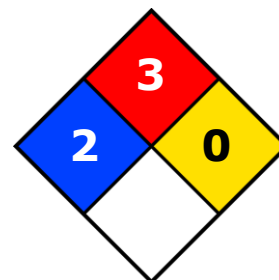
USA

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)

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SUPER SHIELD™ NICKEL EPOXY CONDUCTIVE COATING 841ER-PART A**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 substances that are listed as hazardous air pollutants.

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

This product contains 2-butanone acetate (CAS# 78-93-3; reportable quantity = 5 000 lb [2 268 kg]) n-butyl acetate (CAS# 123-86-4; reportable quantity = 5 000 lb [2 268 kg]), butan-1-ol (CAS# 71-36-3; reportable quantity = 5 000 lb [2 268 kg]), and nickel (CAS# 7440-02-0, reportable quantity = 100 lb [45.4 kg]), which are subject to the reporting requirements of section 313 Title III of the SARA of 1986 and 40 CFR part 372.

TSCA (Toxic Substances Control Act of 1976, USA)

All substances are TSCA listed.

California Proposition 65 (Chemicals known to cause cancer or reproductive toxicity, Sept 2, 2011 revision, USA).

This product contains nickel (CAS# 7440-02-0), which is listed as a carcinogen.

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

MSDS Prepared by	Michel Hachey
Date of Creation	31 October 2016
Supersedes	28 January 2016
Reason for Changes:	Change to the product formula.

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SUPER SHIELD™ NICKEL EPOXY CONDUCTIVE COATING 841ER-PART A**References**

- 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®), MDL Information Systems, Inc.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists (USA)
EC50	Half maximal effective concentration
EL50	Half maximal effective loading
NOELR	No observable effect loading ratio
GHS	Globally Harmonized System of Classification of Labeling of Chemicals
LC50	Lethal Concentration 50%
LCLo	Lowest published lethal concentration
LD50	Lethal Dose 50%
PEL	Permissible Exposure Limit
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

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