SILVER CONDUCTIVE EPOXY, MODERATE CURE/HIGH CONDUCTIVITY 8331-PART A

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Silver Conductive Epoxy Adhesive, Moderate Cure / High Conductivity

SDS Code: 8331–Part A

Related Part # 8331-14G, 8331-50ML, 8331-200ML (withdrawn: 8331-429G, 8331-454G)

Recommended Use and Restriction on Use

Use: Electrically conductive epoxy adhesive resin part for use with hardeners

Uses Advised Against: Not available

Details of Manufacturer or Importer

Manufacturer
MG Chemicals
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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

Section 2: Hazard(s) Identification

Classification of Hazardous Chemical

GHS Categories

Criteria		Category	Signal Word	Pictograms
Mutagenicity		2	Warning	Health
Sensitization	Skin sensitizer	1	Warning	Exclamation
Environmental Hazard	Acute Aqua. Tox.	1	Warning	Environment
Environmental Hazard	Chronic Aqua. Tox.	1	Warning	Environment

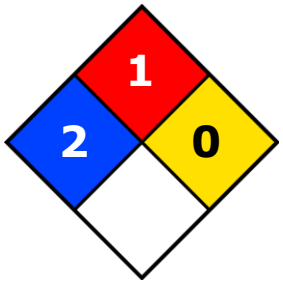
Note: The degree of severity is ranked within each hazard class from 1 (Highest Severity) to up to 5 (Lowest Severity), which is opposite to HMIS and NFPA conventions. Severity category rankings do not allow comparisons between classes.

Other Classifications

HMIS® RATING

HEALTH:	* 2
FLAMMABILITY:	1
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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Label Elements

Signal Word	WARNING
Pictograms	**Hazard Statements**
	H317: May cause an allergic skin reaction
	H341: Suspected of causing genetic defects
	H410: Very toxic to aquatic life with long lasting effects

Prevention	Precautionary Statements
P102	Keep out of reach of children.
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing fumes/vapors.
P280	Wear protective gloves.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.

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Response	**Precautionary Statements**
P302 + P352	IF ON SKIN: Wash with plenty of water.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.
P308 + P313	For all routes of exposure: If exposed or concerned: Get medical advice.
P391	Collect spillage.
Storage	**Precautionary Statements**
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**
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	67%
28768-32-3	4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]	33%

Section 4: First-Aid Measures

Exposure Condition	*GHS Code/Symptoms/Precautionary Statements*
IF ON SKIN	P302 + P352, P333 + P313, P362 + P364
Immediate *or Delayed* Symptoms	*redness, mild irritation, dry skin, rash*
Response	Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.
IF IN EYES	P305 + P351 + P338, P337 + P313
Immediate Symptoms	*redness, mild irritation*
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 INHALED	P304 + P340, P312, P308 + P313
Immediate Symptoms	*cough, irritation of the respiratory track*
Response	Remove person to fresh air and keep comfortable for breathing. IF exposed or concerned: Get medical advice/attention.
IF SWALLOWED	P301 + P330, P331, P308 + P313
Immediate Symptoms	*Irritation*
Response	Rinse mouth. Do NOT induce vomiting. IF exposed or concerned: Get medical advice/attention.

Section 5: Fire-Fighting Measures

Extinguishing Media	In case of fire: Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish.
Specific Hazards	Not flammable or combustible, but burns if involved in a fire. Produces irritating smoke of unknown toxicity in fires. Inhalation of silver oxide fumes may cause metal fever and irritate the respiratory tract. The flu-like symptoms of metal fever may be delayed, occurring 4 to 12 hours after exposure. Prevent fire-fighting wash from entering waterway or sewer system.
Combustion Products	Produces carbon oxides (CO,CO_2), and toxic metal 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 the fumes/mist/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	No containment method required—this product is not readily flowable
Cleaning Methods	Collect liquid in a sealable, chemical-resistant container. Sprinkle inert absorbent compound onto spill, then sweep into the container. Wash residue with a paper towel wetted with alcohol, ethyl lactate, or another suitable organic solvent; and place dirty towels in container. Use 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.

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

Take off contaminated clothing and wash it before reuse. Contaminated work clothing should not be allowed out of the workplace.

Avoid breathing fumes/mist/vapors or contact with skin or eyes.

Do not eat, drink, or smoke when using this product.

Avoid release to the environment.

Handling

Wear protective gloves/clothing/eye protection.

Wash hands thoroughly after handling.

Collect spillage.

Storage

Keep container tightly closed.

Store locked up.

Section 8: Exposure Controls/Personal Protection

Substances with Occupational Exposure Limit Values

Chemical Name	Country	Long Term Exposure Limits (PEL)	Short Term Exposure Limits (STEL)
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	3 mg/m^3	Not established

Note: The ACGIH[1], OSHA, and Canadian provinces exposure limits were consulted. Limits from by RTECS database[2] of the Canadian Centre for Occupational Health and Safety (CCOHS) a data from suppliers' SDS were also consulted. Short term exposure limits (STEL) are usually for 15 min and long term permissible exposure limits (PEL) for 8 h.

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Engineering Controls

Ventilation

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

Because the silver flakes are inextricably bound to the adhesive mixture; therefore they are not available as airborne hazards under normal use. Ensure adequate ventilation if the product is mechanically misted or aerosolized.

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, latex, neoprene, or other chemically resistant gloves.

For incidental contacts, use chemically resistant gloves.

Respiratory Protection

For over-exposures up to 10 x OEL of dust/mist/fumes, wear respirator such as a half-mask respirator with organic vapor cartridges and particulate filer.

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

If the product is heated or the worker has a known allergic reaction, consider using a full mask with organic vapor cartridge or with an independent air supply.

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	Solid, paste	**Lower Flammability Limit**	Not available
Appearance	Silver grey	**Upper Flammability Limit**	Not available
Odor	Slight	**Vapor Pressure @20 °C**	Not available
Odor Threshold	Not available	**Vapor Density**	Not available
pH	Not available	**Specific Gravity @25 °C**	2.5
Freezing/Melting Point	Not available	**Solubility in Water**	Insoluble
Boiling Point	Not available	**Partition Coefficient**	Not available
Flash Point a)	>150°C [>302 °F]	**Auto-ignition Temperature**	Not available
Evaporation Rate	Not available	**Decomposition Temperature**	Not available
Flammability (solid, gas)	Not available	**Viscosity @40 °C**	>20.5 mm^2/s

a) The closed cup flash point values are based on the 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline] resin component.

Section 10: Stability and Reactivity

Reactivity	Reacts exothermically with amines.
Chemical Stability	Chemically stable at normal temperatures and pressures
Conditions to Avoid	Avoid ignition sources, open flames, and incompatible substances. Do not use in a way that forms mist or aerosolizes the product.
Incompatibilities	Avoid strong oxidizing agents, strong acids, strong bases, ammonia, peroxides, perchlorates, phosphorus, selenium, and sulfur.
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

Skin contact, Inhalation, Ingestion, and Eye contact

Symptoms Summary

Eyes May cause redness and mild irritation.

Skin May cause skin redness, mild irritation, dry skin, or allergic contact dermatitis.

Inhalation May cause cough, respiratory irritation, sore throat, or asthma.

Ingestion It may cause irritation (see inhalation symptoms).

Chronic Prolonged and repeated exposure may lead to skin sensitization.

Prolonged and repeated ingestion or inhalation of silver may yield to an irreversible blue-grey discoloration of the skin.

Possible mutagenic effect.

Acute Toxicity (Lethal Exposure Concentrations)

Chemical Name	LD50 oral	LD50 dermal	LC50 inhalation
silver	>5 g/kg Guinea Pig	≥2 000 mg/kg Rabbit	5.16 mg/L Rat 4 h (dust)
4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline]	≥5 000 mg/kg Rat	≥3 000 mg/kg Rabbit	24 000 mg/m^3 Rat ≥4 h (vapor)

Note: Toxicity data from the RTECS[2] and ECHA database were consulted. The data from supplier (M)SDS were also consulted.

Section continued on the next page

Other Toxicological Effects

Skin corrosion/irritation	Mild skin irritant.
Serious eye damage/irritation	Causes mild eye irritation. Contains mechanically abrasive particles.
Sensitization (allergic reactions)	The epoxy resin components (CAS# 28768-32-3) may cause skin sensitization in humans.
Carcinogenicity (risk of cancer)	None of the ingredients are classified or listed as a carcinogen by IARC, ACGIH, CA Prop 65, or NTP.
Mutagenicity (risk of heritable genetic effects)	In vitro and in vivo studies for 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline] show positive results for mutagenicity.
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	Based on available data, the classification criteria are not met.
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. The mixture does not contains Class 1 aspiration toxicant and its viscosity is >20.5 mm^2/s at 40 °C.

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 particles of less than a 1 mm but more than 100 nm (larger than nanoparticles), which release ionic silver levels that is very toxic to the environment. While massive silver is insoluble in water, its powders 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 1 (M = 10 for silver) of the EU.

In Europe, similar epoxy resin with CAS# 28768-32-3 is generally classified as chronic category 2 marine pollutant due to LC50 96 h of >1 mg/L but ≤10 mg/L.

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

Not readily biodegradable

Bioaccumulation

Not available

Other Effects

Not available

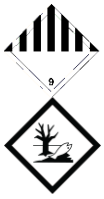
Section 13: Disposal Information

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 kg and under	Sizes greater than 5 kg
Limited Quantity 	**UN number**: UN3077 **Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (silver particles <1 mm; 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline]) **Class:** 9 **Packing Group**: III **Marine Pollutant:** Yes Flash Point ≥150 °C [≥302 °F] 

Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Sizes 30 g and under	Sizes greater than 30 g up to 30 kg
Excepted Quantity Document as class **E1** 	**Limited Quantity** **UN number**: UN3077 **Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (silver particles <1 mm; 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline]) **Class:** 9 **Packing Group**: III **Marine Pollutant:** Yes Flash Point ≥150 °C [≥302 °F] 

Section continued on the next page

Sea

Refer to IMDG regulations.

Sizes 30 g and under

Excepted Quantity
Document as class **E1**

Sizes 5 kg and under
Limited Quantity

Sizes greater than 5 kg

UN number: UN3077
Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (silver particles <1 mm; 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline])
Class: 9
Packing Group: III
Marine Pollutant: Yes

Flash Point ≥150 °C [≥302 °F]

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

Section 15: Regulatory Information

Canada

WHMIS 1988 Classification

D2A – Very Toxic (Mutagenicity); D2B – Toxic (Skin Sensitizer)

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.

Health Canada

Products produced by MG Chemicals intended for retail display conform to the Canadian Consumer Labeling Regulations.

Section continued on the next page

USA

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 silver (CAS# 7440-22-4; reportable quantity = 1000 lb), which is 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, June 06, 2014 revision, USA).

This product does not contain any listed substances 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	18 June 2015
Supersedes	05 August 2014

Reason for Changes: Changes to better meet HCS 2012 and WHMIS 2015 requirements. Small formulation change due to raw material supplier composition declaration.

Section continued on the next page

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
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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