

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**

# Safety Data Sheet

**Section 1: Identification****Product Identifier and Other Means of Identification**

**Product Name:** Silver Conductive Epoxy Adhesive: Slow Cure / High Conductivity

**SDS Code:** 8331S-Part A

**Related Part #** 8331S-15G, 8331S-50ML, 8331S-200ML

**Recommended Use and Restriction on Use**

**Use:** Silver filled electrically conductive adhesive—epoxy resin for use with hardener

**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

**☎** +1-800-340-0772

**FAX** +1-800-340-0773

**E-MAIL** [support@mgchemicals.com](mailto:support@mgchemicals.com)

**WEB** [www.mgchemicals.com](http://www.mgchemicals.com)

**☎** +1-905-331-1396

**FAX** +1-905-331-2682

**E-MAIL** [info@mgchemicals.com](mailto:info@mgchemicals.com)

**E-MAIL** (Competent Person): [sds@mgchemicals.com](mailto: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

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**
**Section 2: Hazard(s) Identification**
**Classification of the Hazardous Materials**
**GHS Categories**

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

**Label Elements**

Signal Word	<b>WARNING</b>
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

*Section continued on the next page*

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**

<b>Prevention</b>	<b>Precautionary Statements</b>
P102	Keep out of reach of children.
P201 + P202	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing fumes/vapors/mist.
P272	Contaminated work clothing must not be allowed out of the workplace.
P280	Wear protective gloves/protective clothing.
P273	Avoid release to the environment.
<b>Response</b>	<b>Precautionary Statements</b>
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	IF exposed or concerned: Get medical advice/attention.
P391	Collect spillage.
<b>Storage</b>	<b>Precautionary Statements</b>
P405	Store locked up.
<b>Disposal</b>	<b>Precautionary Statements</b>
P501	Dispose of contents/container in accordance to local/regional/international regulations.

**Hazards Not Otherwise Classified**

<b>Other Criteria</b>	<b>Hazard Statements/Precautionary Statement</b>	<b>Signal Word</b>	<b>Pictograms</b>
<b>Argyria Warning</b>	Long term ingestion or inhalation of silver can lead to an irreversible blue-grey discoloration of the skin.	<i>None</i>	<i>None</i>
<b>Dermatitis or Eczemas</b>	Prolonged and repeated exposure to uncured epoxy resins may cause dermatitis or eczemas.	<i>None</i>	<i>None</i>

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**
**Section 3: Composition/Information on Ingredients**

CAS #	Chemical Name	%(Weight)
7440-22-4	silver (flakes < 1 mm)	67%
28768-32-3	4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline]	31%
17557-23-2	neopentyl glycol diglycidyl ether	2%

**Section 4: First-Aid Measures**

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

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A****Section 5: Fire-Fighting Measures**

<b>Extinguishing Media</b>	In case of fire: Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish. Use water spray to cool containers.
<b>Specific Hazards</b>	<p>Not flammable or combustible, but will burn if involved in a fire. Produces irritating smoke and toxic fumes in fires.</p> <p>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.</p> <p>Prevent fire-fighting wash from entering waterway or sewer system.</p>
<b>Combustion Products</b>	Produces carbon oxides (CO, CO <sub>2</sub> ), silver oxide fumes, and smoke
<b>Fire-Fighter</b>	Wear self-contained breathing apparatus and full fire-fighting turn-out gear.

**Section 6: Accidental Release Measures**

<b>Personal Protection</b>	Use personal protection recommended in Section 8.
<b>Precautions for Response</b>	Avoid breathing the fumes/vapors. Keep away from extreme heat or open flames.
<b>Environmental Precautions</b>	Avoid releasing to the environment. Prevent spill from entering drains and waterways. Do not flush to sewer.
<b>Containment Methods</b>	None required—this product is not readily flowable.
<b>Cleaning Methods</b>	Collect spill in a sealable container. Wipe residue with a paper towel wetted with alcohol (or other suitable organic solvent) and place dirty towels in container. Wash spill area with soap and water to remove the last traces of residue.
<b>Disposal Methods</b>	Dispose of spill waste according to Section 13.

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**
**Section 7: Handling and Storage**

<b>Prevention</b>	Keep out of reach of children.  Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.  Avoid breathing dust/fumes/mist/vapors.  Contaminated work clothing must not be allowed out of the workplace.  Avoid release to the environment.
<b>Handling</b>	Wear protective gloves/eye protection.  Take off contaminated clothing and wash it before reuse.  Wash hands thoroughly after handling.  Collect spillage.
<b>Storage</b>	Store locked up.

**Section 8: Exposure Controls/Personal Protection**
**Substances with Occupational Exposure Limit Values**

Chemical Name	Country or Vendor	Long Term Exposure Limits (PEL)	Short Term Exposure Limits (STEL)
silver <i>(metal dust, mist)</i> <i>(metal)</i> <i>(Ag and its compounds)</i> <i>(metal, dust, fumes)</i>	ACGIH	0.1 mg/m <sup>3</sup>	Not established
	U.S.A. OSHA PEL	0.01 mg/m <sup>3</sup>	Not established
	Canada AB	0.1 mg/m <sup>3</sup>	Not established
	Canada BC	0.01 mg/m <sup>3</sup>	0.03 mg/m <sup>3</sup>
	Canada ON	0.1 mg/m <sup>3</sup>	Not established
	Canada QC	0.1 mg/m <sup>3</sup>	Not established

*Note:* The ACGIH<sup>1</sup>, OSHA, and Canadian provinces exposure limits were consulted. Limits from by RTECS database<sup>2</sup> of the Canadian Centre for Occupational Health and Safety (CCOHS) a data from suppliers' SDS were also consulted.

**Engineering Controls**

<b>Ventilation</b>	General ventilation is adequate for normal use; keep airborne exposure as low as possible.  <b>RECOMMENDATION:</b> If the product is heated, use of local exhaust or full mask with organic vapor cartridge/independent air supply.
--------------------	---

*Section continued on the next page*

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A****Personal Protective Equipment****Eye protection**

Wear appropriate protective eyeglasses or chemical safety goggles.

**RECOMMENDATION:** Use safety glasses with lateral protection (side shields).

**Skin Protection**

Wear appropriate protective clothing to prevent skin contact.

**RECOMMENDATION:** Use butyl rubber, neoprene, or other chemically resistant gloves.

**Respiratory Protection**

If exposed to high levels of fumes/vapors, wear respirator such as a half-mask respirator with organic vapor cartridge and particulate filter.

If exposed to the product in extreme heat or combustion conditions, wear a NIOSH approved self-contained breathing apparatus (SCBA) or supplied air respirator.

**RECOMMENDATION:** Consult your local safety supply store to ensure your respirator has a NIOSH (U.S.) approved filter cartridges appropriate for the ingredients listed in section 3 of this SDS. Ensure that the respirator is fitted to the employee by a professional.

**General Hygiene Considerations**

Wash hands thoroughly with water and soap after handling.

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**
**Section 9: Physical and Chemical Properties**

<b>Physical State</b>	Solid, paste	<b>Lower Flammability Limit</b>	Not available
<b>Appearance</b>	Silver grey	<b>Upper Flammability Limit</b>	Not available
<b>Odor</b>	Not available	<b>Vapor Pressure @25 °C</b>	Not available
<b>Odor Threshold</b>	Not available	<b>Vapor Density</b>	Not available
<b>pH</b>	Not available	<b>Specific Gravity @20 °C</b>	2.5
<b>Freezing/Melting Point</b>	Not available	<b>Solubility in Water</b>	Insoluble
<b>Boiling Point</b>	Not available	<b>Partition Coefficient</b>	Not applicable
<b>Flash Point <sup>a)</sup></b>	≥127 °C [>261 °F]	<b>Auto-ignition Temperature</b>	Not available
<b>Evaporation Rate</b>	Not available	<b>Decomposition Temperature</b>	Not available
<b>Flammability (solid, gas)</b>	Not available	<b>Viscosity @40 °C</b>	>>20.5 mm <sup>2</sup> /s

a) The closed cup flash point values are based on the neopentyl glycol diglycidyl ether component.



**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A****Section 10: Stability and Reactivity**

<b>Reactivity</b>	Reacts exothermically with amines.
<b>Chemical Stability</b>	Chemically stable at normal temperatures and pressures
<b>Conditions to Avoid</b>	Incompatible substances and extreme temperatures
<b>Incompatibilities</b>	Strong oxidizing agents, strong acids, strong bases, acetylene, ammonia, peroxides
<b>Polymerization</b>	Will not occur
<b>Decomposition</b>	For thermal decomposition, see combustion products in Section 5.

**Section 11: Toxicological Information****Routes of Exposure**

Ingestion, Inhalation, and Skin contact

**Symptoms Summary**

<b>Eyes</b>	May causes redness and mild eye irritation.
<b>Skin</b>	May cause mild skin irritation, redness, or rash.
<b>Inhalation</b>	May cause cough, irritation of the respiratory track, sore throat, or asthma.
<b>Ingestion</b>	It may cause irritation (also see inhalation symptoms).
<b>Chronic</b>	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.

*Section continued on the next page*

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**
**Acute Toxicity (Lethal Exposure Concentrations)**

<b>Chemical Name</b>	<b>LD50 oral</b>	<b>LD50 dermal</b>	<b>LC50 inhalation</b>
silver	>2 000 mg/kg Rat	>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	Not available
neopentyl glycol diglycidyl ether	2 000 mg/kg Rat <sup>a)</sup>	2 150 mg/kg Rabbit <sup>a)</sup>	Not established

*Note:* Toxicity data from the RTECS<sup>2</sup> and ECHA databases were consulted. The data from supplier (M)SDS were also consulted.

a) Estimate provided by supplier

**Other Toxicological Effects**

<b>Skin corrosion/irritation</b>	Mild skin irritant
<b>Serious eye damage/irritation</b>	Mild eye irritant
<b>Respiratory and skin sensitization</b> (allergic reactions)	The epoxy resin components (CAS# 28768-32-3 and 17557-23-2) may cause skin sensitization in humans
<b>Carcinogenicity</b> (risk of cancer)	None of the ingredients are classified or listed as a carcinogen by IARC, ACGIH, CA Prop 65, or NTP.
<b>Mutagenicity</b> (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.
<b>Reproductive Toxicity</b> (risk to sex functions)	Based on available data, the classification criteria are not met.
<b>Teratogenicity</b> (risk of fetus malformation)	Based on available data, the classification criteria are not met.
<b>STOT-single exposure</b>	Based on available data, the classification criteria are not met.
<b>STOT-repeated exposure</b>	Based on available data, the classification criteria are not met.
<b>Aspiration hazard</b>	Classification criteria are not met: the mixture does not contains Class 1 aspiration toxicant and its viscosity is >20.5 mm <sup>2</sup> /s at 40 °C.

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-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 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.

Similar epoxy resin mixtures with CAS# 25068-38-6 and average molecular weight of less than 700 are 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 effect

Avoid release to the environment. Collect spillage.

**Persistence and Biodegradability**

The content is not readily biodegradable.

**Bioaccumulative Potential**

Not available

**Mobility in Soil**

Not available

**Other Effects**

Not available

**Section 13: Disposal Considerations**

Dispose of contents in accordance with all local, provincial, state, and federal regulations.

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**
**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

**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

**Air**

**Refer to ICAO-IATA Dangerous Goods Regulations.**

Sizes 30 g and under

**Excepted Quantity**

Document as class

**E1**

Refer to Package

 Mark 2.6.7.1 in **IATA**

for further instruction



Sizes greater than 30 g up to 30 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


*Section continued on the next page*

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**
**Sea**

Refer to IMDG regulations.	
Sizes 30 g and under <b>Excepted Quantity</b> Document as class <b>E1</b>	
Sizes 5 kg and under <b>Limited Quantity</b>	
Sizes greater than 5 kg <b>UN number:</b> UN3077 <b>Shipping Name:</b> ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (silver particles <1 mm; 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline]) <b>Class:</b> 9 <b>Packing Group:</b> III <b>Marine Pollutant:</b> Yes	

**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/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.

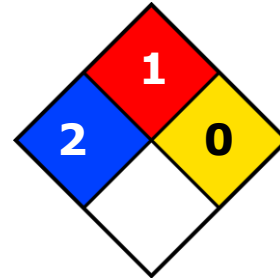
**Health Canada**

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

*Section continued on the next page*

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A****USA****Other Classifications****HMIS® RATING**

<b>HEALTH:</b>	<b>* 2</b>
<b>FLAMMABILITY:</b>	<b>1</b>
<b>PHYSICAL HAZARD:</b>	<b>0</b>
<b>PERSONAL PROTECTION:</b>	

**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 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, Sept 2, 2011 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.

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A****Section 16: Other Information**

**SDS Prepared by** Michel Hachey  
**Date of Revision** 26 September 2015  
**Supersedes** 16 January 2013

**Reason for Changes:** Revised to better harmonize and meet HCS2012 and WHMIS 2015 requirements.

**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)
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](http://www.mgchemicals.com).

Email: [support@mgchemicals.com](mailto:support@mgchemicals.com)

*Section continued on the next page*



Registered Quality System **ISO 9001:2008**

QMI File #004008

Burlington, Ontario, Canada

---

**SILVER CONDUCTIVE EPOXY ADHESIVE: SLOW CURE/HIGH CONDUCTIVITY 8331S-PART A**

**Mailing Addresses** *Manufacturing & Support*

1210 Corporate Drive  
Burlington, Ontario, Canada  
L7L 5R6

*Head Office*

9347-193rd Street  
Surrey, British Columbia, Canada  
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.