

SILVER CONDUCTIVE EPOXY ADHESIVE

8331-PART A

# Material Safety Data Sheet

## Section 1: Product and Company Identification

**Product Name:** Silver Conductive Epoxy Adhesive: Moderate Cure / High Conductivity**MSDS Code:** 8331-Part A**Related Part #:** 8331-14G, 8331-40G, 8331-429G, 8331-454G**Use:** Silver filled electrically conductive adhesive for repairing traces on circuit boards, cold soldering, and bonding**Emergency Contact:** CANUTECH ☎: 1-613-996-6666, Collect 24/7**Manufacturer:** MG Chemicals (Head Office), 9347-193 Street, Surrey, B.C., V4N 4E7**Technical Contacts:** ☎ 1-800-201-8822 FAX 1-800-708-9888**E-MAIL:** [support@mgchemicals.com](mailto:support@mgchemicals.com) **WEB** [www.mgchemicals.com](http://www.mgchemicals.com)

## Section 2: Hazards Identification

### WHMIS Classification



D2B - Toxic Material (Skin/Eye Irritation; Skin Sensitization in Humans)

### GHS Pictograms

Signal Word  
WARNING*Continued on the next page*

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**GHS Categories**

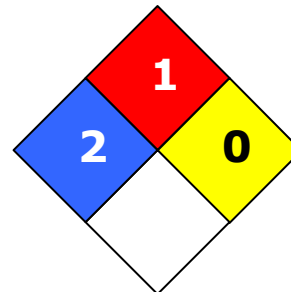
| Criteria             |                    | Category | Signal Word | Symbol        |
|----------------------|--------------------|----------|-------------|---------------|
| Eye Irritation       |                    | 2        | Warning     | Exclamation   |
| Skin Irritation      |                    | 2        | Warning     | Exclamation   |
| Sensitization        | Skin sensitizer    | 1        | Warning     | Exclamation   |
| Environmental Hazard | Acute Aqua. Tox.   | 1        | Warning     | Environmental |
| Environmental Hazard | Chronic Aqua. Tox. | 1        | Warning     | Environmental |

Note: Classification based on calculation method for mixture components

**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)

**Physical Hazards**

GHS Code: Hazard Statement

none

**Health Hazards**

GHS Code: Hazard Statement

H319: Causes serious eye irritation

H315: May cause skin irritation

H317: May cause allergic skin reaction

**Environmental Hazards**

GHS Code: Hazard Statement

H400: Very toxic to aquatic life

H410: Very toxic to aquatic life with long lasting effects

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- Eyes** Causes moderate to severe eye irritation if splashed in eyes. The adhesive contains mechanically abrasive particles. May also cause eye redness or pain.
- Skin** May cause mild to moderate skin irritation and allergic skin reactions.
- Inhalation** *Not a likely route of exposure.* May cause nose, throat and lung irritation.
- Ingestion** *Not a likely route of exposure.* No acute toxicity effect known. May cause irritation. May cause allergic reactions.
- Chronic** Prolonged and repeated exposure to the uncured epoxy resins used may cause dermatitis, eczemas, and sensitization.
- Long term accumulation of silver can lead to Argyria, which is an irreversible blue-grey discoloration of the skin.

**Section 3: Hazardous Ingredients**

| CAS #      | Chemical Name   | Wt%     | ACGIH TWA             | OSHA PEL               | STEL            |
|------------|---|---------|-----------------------|------------------------|-----------------|
| 7440-22-4  | silver  | 60-100% | 0.1 mg/m <sup>3</sup> | 0.01 mg/m <sup>3</sup> | Not established |
| 28768-32-3 | 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline] | 15-40%  | Not established       | Not established        | Not established |

*Note:* Limits from by RTECS database of the Canadian Centre for Occupational Health and Safety (CCOHS).<sup>1</sup> Data from suppliers' MSDS were also consulted.

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**Section 4: First Aid Measures**

| <i>Exposure Condition</i>                            | <i>GHS Code: Precautionary Statement</i>   |
|--|--|
| <b>IF IN EYES</b>                                    | P305   |
| <b>Symptoms</b>                                      | Immediate: <i>irritation, redness, pain</i>  |
| <b>Response</b>                                      | P351: Rinse cautiously with water for several minutes.<br>P338: Remove contact lenses, if present and easy to do.<br>Continue rinsing.             |
| <b>If eye irritation persists</b>                    | P313: Get medical attention.   |
| <b>IF ON SKIN</b>                                    | P302   |
| <b>Symptoms</b>                                      | Immediate: <i>irritation, redness;</i><br>Delayed: <i>dry skin, rash, defatting, eczema</i>  |
| <b>Response</b>                                      | P362+ P364 + P272: Take off contaminated clothing and wash it before reuse. Contaminated work clothing should not be allowed out of the workplace. |
| <b>If skin irritation, rash occurs, or concerned</b> | P352: Wash with plenty of water.<br>P313: Get medical advice/attention.  |
| <b>IF INHALED</b>                                    | P304 ( <i>Not a likely route of exposure under normal use</i> )  |
| <b>Symptoms</b>                                      | Immediate: <i>cough, sore throat, respiratory system irritation</i><br>Delayed: <i>asthma</i>  |
| <b>Response</b>                                      | P340: Remove person to fresh air (out of the contaminated zone) and keep comfortable for breathing.  |
| <b>If feeling unwell</b>                             | P312: Call a POISON CENTRE/doctor.   |
| <b>IF SWALLOWED</b>                                  | P301 ( <i>Not a likely route of exposure under normal use</i> )  |
| <b>Symptoms</b>                                      | Immediate: <i>irritation</i>   |
| <b>Response</b>                                      | P330: Rinse mouth.<br>P331: Do NOT induce vomiting.  |
| <b>If feeling unwell</b>                             | P312: Call a POISON CENTRE/doctor.   |

*Note: GHS codes and corresponding precaution statements are used when available.*

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**Section 5: Fire Fighting Measures**

|                                 |                 |                                  |                      |  |                 |
|---------------------------------|-----------------|----------------------------------|----------------------|--|-----------------|
| <b>Autoignition Temperature</b> | Not Established | <b>Flash Point</b> <sup>a)</sup> | >150 °C<br>[>302 °F] | <b>LFL [LEL]</b> <sup>b)</sup><br><b>UFL [UEL]</b> | Not Established |
|---------------------------------|-----------------|----------------------------------|----------------------|--|-----------------|

**In case of fire** P370

**Response** P378: Use dry chemical, carbon dioxide, or chemical foam to extinguish. Use water spray to cool containers.

**Combustion Products** Produces CO, CO<sub>2</sub>, toxic fumes, and smoke.

**Fire-Fighter** Wear self-contained breathing apparatus for fire fighting

**General Information** Toxic metal fumes may be released in fire. In presence of strong oxidizers and air, the silver metal powder may lead to an explosion.

*Note:* The GHS codes and the GHS precaution statements are used. The format is *GHS Codes: Statements.*

a) Closed cup value for the neopentyl glycol diglycidyl ether component.

b) LFL = Lower Flammability [or Explosion] Limit (in volume %);  
UFL = Upper Flammability [or Explosion] Limit (in volume %)

**Section 6: Accidental Release Measures**

**Personal Protection:** See Section 8. Avoid breathing the mist/vapors.

**Containment** Remove all sources of ignition.

**Cleaning** Collect liquid in a sealable, solvent-resistant container. Sprinkle inert absorbent compound onto spill, then sweep into the container. Wipe up further residue with paper towel wetted with alcohol and place dirty towels in container. Wash spill area with soap and water to remove the last traces of residue.

**RECOMMENDATION:** Use a plastic, stainless steel, or carbon steel container.

**Disposal** Dispose of spill waste according to Section 13.

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**Prevention** P262: Do not get in eye, on skin, or on clothing.

P261 + P271 + P284: Avoid breathing fume/vapors. Use only outdoors or in well ventilated area. In cases of inadequate ventilation wear respiratory protection.

P270: Do not eat, drink, or smoke when using this product.

**RECOMMENDATION:** Protect from heat. Above 88 °C used closed system ventilation.

**Handling** P280: Wear protective gloves/clothing/eye protection.

P264: Wash hands thoroughly after handling.

**Storage** P403 + P233+ P235 + P405: Keep Container tightly closed. Store in a well-ventilated area. Keep cool. Store locked up.

**RECOMMENDATION:** Keep in a dry and clean area, away from incompatible substances.

*Note:* The GHS codes and the GHS precaution statements are used.

**Section 8: Exposure Controls/Personal Protection****Routes of Entry**

Eyes, ingestion, inhalation, and skin

**Engineering Controls**

**Ventilation** Keep airborne concentrations below exposure limits given in Section 3.

**RECOMMENDATION:** If the product is heated or worker is allergic, consider using a full mask with organic vapor cartridges.

**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 of protective gloves in butyl rubber, latex, neoprene, or other chemically resistant gloves.

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**Respiratory Protection** If exposed to mist, wear respirator such as a half-mask respirator.

**RECOMMENDATION:** Consult your local safety supply store to ensure your respirator has filter cartridges appropriate for the ingredients listed in section 3 of this MSDS, and that the respirator is 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.

**Section 9: Physical and Chemical Properties**

|                                 |                 |                                 |                     |                            |                 |
|---------------------------------|-----------------|---------------------------------|---------------------|----------------------------|-----------------|
| <b>Physical State</b>           | Liquid          | <b>Odor</b>                     | Slight              | <b>Odor Threshold</b>      | Not established |
| <b>Appearance</b>               | Silver grey     | <b>Specific Gravity</b>         | 2.47                | <b>Freezing Point</b>      | Not established |
| <b>Boiling Point</b>            | Not established | <b>Vapor Pressure @ 20 °C</b>   | Not established     | <b>Evaporation Rate</b>    | Not established |
| <b>Autoignition Temperature</b> | Not established | <b>Flash Point<sup>a)</sup></b> | >150°C<br>[>302 °F] | <b>Vapor Density</b>       | Not established |
| <b>Lower Flammability Limit</b> | Not established | <b>Upper Flammability Limit</b> | Not established     | <b>Decomposition Temp.</b> | Not available   |
| <b>Viscosity</b>                | Paste           | <b>Partition Coefficient</b>    | Not established     | <b>Solubility in Water</b> | Insoluble       |
| <b>pH</b>                       | Not available   |                                 |                     |                            |                 |

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

**SILVER CONDUCTIVE EPOXY ADHESIVE****8331-PART A****Section 10: Stability and Reactivity**

|                            |   |
|----------------------------|---|
| <b>Stabilities</b>         | Chemically stable at normal temperatures and pressures  |
| <b>Conditions to Avoid</b> | Ignition sources and incompatible substances.   |
| <b>Incompatibilities</b>   | Strong oxidizing agents, strong acids, strong bases, ammonium nitrate, ammonia, peroxides, perchlorates, phosphorus, selenium, and sulfur.<br><br><i>Note:</i> React with amines. |
| <b>Polymerization</b>      | Will not occur  |
| <b>Decomposition</b>       | Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5   |

**Section 11: Toxicological Information**

|   |  |
|---|--|
| <b>Skin corrosion/irritation</b>                        | Skin irritant. Prolonged or repeated skin contact may cause dermatitis and eczemas                 |
| <b>Serious eye damage/irritation</b>                    | Causes moderate eye irritation. Contains mechanically abrasive particles                           |
| <b>Sensitization</b> (allergic reactions)               | The epoxy resin components (CAS# 28768-32-3-6) may cause skin sensitization in humans              |
| <b>Carcinogenicity</b> (risk of cancer)                 | Not classified or listed as a carcinogen by IARC, ACGIH, CA Prop 65, or NTP                        |
| <b>Mutagenicity</b> (risk of heritable genetic effects) | No data available  |
| <b>Reproductive Toxicity</b> (risk to sex functions)    | No data available  |
| <b>Teratogenicity</b> (risk of fetus malformation)      | No data available  |
| <b>STOT-single exposure</b>                             | No data available  |
| <b>STOT-repeated exposure</b>                           | No data available  |
| <b>Aspiration hazard</b>                                | Viscosity at 40 °C is $\gg 20.5 \text{ mm}^2/\text{s}$ , thus not classified as aspiration hazard. |

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**SILVER CONDUCTIVE EPOXY ADHESIVE****8331-PART A****Acute Toxicity (Lethal Exposure Concentrations)**

| <b>Chemical Name</b>                                 | <b>LD50 oral</b>                | <b>LD50 dermal</b> | <b>LC50 inhalation</b> | <b>TCLo inhalation</b> |
|--|---------------------------------|--------------------|------------------------|------------------------|
| silver   | >5 g/kg<br>Guinea Pig           | Not<br>Established | Not<br>Established     | Not<br>Established     |
| 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl)aniline] | 4310 mg/kg<br>Rat <sup>a)</sup> | Not<br>Established | Not<br>Established     | Not<br>Established     |

*Note:* Representative toxicity data from by RTECS database of the Canadian Centre for Occupational Health and Safety (CCOHS)<sup>1</sup> data from supplier MSDS were also consulted.  
a) Supplier provided value

**Section 12: Ecological Information**

The ecotoxicity was estimated according to raw material MSDS data and the supporting data used in the classification of registered substances from the European Chemical Agency database (<http://echa.europa.eu>).

Contains silver particles less than a 1 mm in size and 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl)aniline], which are both harmful to the environment.

**Acute Ecotoxicity**

Category 2

*GHS Code: Hazard Statement*

H400: Very toxic to aquatic life

P273: Avoid release to the environment.

P391: Collect spillage.

**Chronic Ecotoxicity**

H410: Very toxic to aquatic life with long lasting effects

**Biodegradability**

The content is not biodegradable.

**Other Effects**

VOC (EPA, WHIMS, and Europe) = 33% [393 g/L]

*\*VOC = Regulated Volatile Organic Content*

*Note:* Silver should be recovered from the waste to reclaim its value.

**SILVER CONDUCTIVE EPOXY ADHESIVE****8331-PART A****Section 13: Disposal Information**

P501: Dispose of contents in accordance with all local, regional, national, and international regulations.

**Section 14: Transport Information**

**Ground** - all sizes less than 4 liters

**Limited Quantity**

**Ground** - sizes greater than 4 liters

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

**UN number:** UN3077; **Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE LIQUID, N.O.S. (Silver and 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline]); **Class:** 9, **Packing Group:** III, Marine Pollutant: Yes

**Air** -

**Refer to IATA Dangerous Goods Regulations.**

**UN number:** UN3077; **Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE LIQUID, N.O.S. (Silver and 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline]); **Class:** 9, **Packing Group:** III, Marine Pollutant: Yes

**Note:** The 14 g and 40g kits use individual part containers that fall under the E1 30g/30ml inner packaging limit and may be shipped as '**DG in Excepted Quantities**'. Refer to Package Mark 2.6.7.1 in **IATA** for further instruction. Document as Class **E1**.

**Sea** -

**Refer to IMDG regulations.**

**UN number:** UN3077; **Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE LIQUID, N.O.S. (Silver and 4,4'-methylenebis [N,N-bis(2-oxiranylmethyl) aniline]); **Class:** 9, **Packing Group:** III, Marine Pollutant: Yes

*Note:* Component supplier SDS transportation sections and labeling were consulted. All involved staff of shipper must be appropriately trained before involvement with the transport of this product, or work under direct supervision of a trained person.

**SILVER CONDUCTIVE EPOXY ADHESIVE****8331-PART A****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.

**Health Canada**

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

**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), 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.

**Europe****RoHS**

This product does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's, or PBDE's, and complies with European RoHS regulations.

**WEEE**

This product is not a piece of electrical or electronics equipment, and is therefore not governed by this regulation.

**SILVER CONDUCTIVE EPOXY ADHESIVE****8331-PART A****Section 16: Other Information**

**MSDS Prepared by** Michel Hachey  
**Date of Issue** 31 October 2012  
**Supersedes** Version 1.0, 08 August 2011

**Reason for Changes:** Changed over to GHS format.

**Reference**

1) All toxicological data were checked against the RTECS (Registry of Toxic Effects of Chemical Substances®)

**Abbreviations**

GHS: Globally Harmonized System of Classification of Labeling of Chemicals

LC50 Lethal Concentration 50%

LCLo Lowest published lethal concentration

LD50 Lethal Dose 50%

N/A Not Applicable

N/E Not Estimated

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)

**Mailing Addresses** *Manufacturing & Support*  
1210 Corporate Drive  
Burlington, Ontario, Canada  
L7L 5R6

*Head Office*  
9347-193rd Street  
Surrey, British Columbia, Canada  
V4N 4E7

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