

Safety Data Sheet

CONDUCTIVE SILVER EPOXY - Part B (Hardener)

1. Product and company identification

Product name	CONDUCTIVE SILVER EPOXY - Part B (Hardener)
Supplier	Ladd Research 3 Ewing Place Essex Junction, VT 05452 USA Tel. 802-658-4961
Synonym	Hardener for adhesive.
Trade name	CIRCUITWORKS® CONDUCTIVE EPOXY - Part B (Hardener)
Manufacturer	Chemtronics 8125 Cobb Center Drive Kennesaw, GA 30152 Tel. 770-424-4888 or toll free 800-645-5244
Code	60802, 60792 (Part B)
Preparation date	06/23/2023
<u>In case of emergency</u>	Chemtrec - 1-800-424-9300 or collect 703-527-3887 (24/7/365)
Product type	Solid.

2. Hazards identification

Emergency overview

Physical state	: Liquid. [Paste.]
Color	: Silver./Gray.
Odor	: Amine-like.
Signal word	: DANGER!
Hazard statements	: CAUSES EYE AND SKIN BURNS. HARMFUL IF ABSORBED THROUGH SKIN. CAUSES RESPIRATORY TRACT IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION.
Precautionary measures	: Do not breathe vapor or mist. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential acute health effects

Inhalation	: Harmful by inhalation. MAY CAUSE RESPIRATORY TRACT IRRITATION. sensitizer - may cause allergic respiratory reaction. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Ingestion	: Harmful if swallowed. May cause chemical burns in the gastrointestinal tract and may be potentially toxic. Silver ingestion may result in generalized argyria.
Skin	: Corrosive to the skin. Causes burns. Toxic in contact with skin. May cause sensitization by skin contact.
Eyes	: Liquid and vapors may cause chemical burns in the eye. Damage is irreversible. Severely irritating to eyes. Risk of serious damage to eyes.

Potential chronic health effects

Chronic effects	: Contains material that can cause target organ damage.
Carcinogenicity	: No known significant effects or critical hazards.

2. Hazards identification

- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : Contains material which causes damage to the following organs: eye, lens or cornea.
Contains material which may cause damage to the following organs: mucous membranes, upper respiratory tract, skin, nose/sinuses, testes.

Over-exposure signs/symptoms

- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Ingestion** : Adverse symptoms may include the following:
stomach pains
- Skin** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
- Eyes** : Adverse symptoms may include the following:
pain or irritation
watering
redness

- Medical conditions aggravated by over-exposure** : Heart, lung, eye, skin. Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

Name	CAS number	%
silver	7440-22-4	60 - 90
3,6-diazaoctanethylenediamin	112-24-3	1 - 10

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

4. First aid measures

- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
-

5. Fire-fighting measures

- Flammability of the product** : In a fire or if heated, a pressure increase will occur and the container may burst.
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
metal oxide/oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
-

6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Ingredient	Exposure limits
silver	ACGIH TLV (United States, 3/2012). TWA: 0.1 mg/m ³ 8 hours. Form: Dust and fumes NIOSH REL (United States, 1/2013). Notes: as Ag TWA: 0.01 mg/m ³ , (as Ag) 10 hours. Form: METAL DUST AND SOLUBLE OSHA PEL (United States, 6/2010). Notes: as Ag TWA: 0.01 mg/m ³ , (as Ag) 8 hours. OSHA PEL 1989 (United States, 3/1989). Notes: as Ag TWA: 0.01 mg/m ³ , (as Ag) 8 hours.
3,6-diazaoctanethylenediamin	AIHA WEEL (United States, 10/2011). Absorbed through skin. TWA: 1 ppm 8 hours.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

- Engineering measures** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

8. Exposure controls/personal protection

- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

- Physical state** : Liquid. [Paste.]
- Flash point** : Closed cup: >93.3°C (>199.9°F) [Setaflash.]
- Color** : Silver./Gray.
- Odor** : Amine-like.
- Boiling/condensation point** : >121°C (>249.8°F)
- Relative density** : 4.1
- Vapor pressure** : <0.013 kPa (<0.1 mm Hg) [room temperature]
- Vapor density** : >1 [Air = 1]
- Volatility** : < 0.5% (w/w)
- Evaporation rate** : <1 (butyl acetate = 1)
- Dispersibility properties** : Not dispersible in the following materials: cold water, hot water, methanol, diethyl ether, n-octanol and acetone.

10. Stability and reactivity

- Chemical stability** : The product is stable.
- Conditions to avoid** : Excessive Heat. Contamination with strong acids, bases, epoxy resins or isocyanates can cause polymerization.
- Incompatible materials** : Avoid epoxy resins and isocyanates, strong acids mineral and organic acids alkalis strong alkalis
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced. Carbon dioxide, carbon monoxide, halogenated compounds, metal oxide/oxides.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
3,6-diazaoctanethylenediamin	LD50 Dermal	Rabbit	805 mg/kg	-
	LD50 Oral	Rat	2500 mg/kg	-

- Conclusion/Summary** : Not available.

Chronic toxicity

- Conclusion/Summary** : Not available.

Irritation/Corrosion

11. Toxicological information

Product/ingredient name	Result	Species	Score	Exposure	Observation
3,6-diazaoctanethylenediamin	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Eyes - Severe irritant	Rabbit	-	49 milligrams	-
	Skin - Severe irritant	Rabbit	-	24 hours 5 milligrams	-
	Skin - Severe irritant	Rabbit	-	490 milligrams	-

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP	ACGIH	EPA	NIOSH
silver	-	-	-	-	-	None.
3,6-diazaoctanethylenediamin	-	-	-	-	-	None.

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
silver	Acute EC50 1.4 µg/l Marine water	Algae - Chroomonas sp.	4 days
	Acute EC50 0.24 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 4500 ppb Fresh water	Crustaceans - Gammarus pseudolimnaeus	48 hours
3,6-diazaoctanethylenediamin	Acute LC50 2.13 to 2.93 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 5 mg/l Marine water	Algae - Glenodinium halli	72 hours
	Acute EC50 3700 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute LC50 33900 µg/l Fresh water	Daphnia - Daphnia magna	48 hours

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	Not regulated.	Adhesive, sealants	-	-		Reportable quantity 1333.3 lbs / 605.33 kg [39.003 gal / 147.64 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
TDG Classification	Not regulated.	Adhesive, sealants	-	-		-
Mexico Classification	Not regulated.	Adhesive, sealants	-	-		-
ADR/RID Class	Not regulated.	Adhesive, sealants	-	-		-
IMDG Class	Not regulated.	Adhesive, sealants	-	-		-
IATA-DGR Class	Not regulated.	Adhesive, sealants	-	-		The environmentally hazardous substance mark may appear if required by other transportation regulations.

PG* : Packing group

15. Regulatory information

HCS Classification : Toxic material
Irritating material
Target organ effects

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined
United States inventory (TSCA 8b): All components are listed or exempted.
Clean Water Act (CWA) 307: silver

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
silver	60 - 90	No.	No.	No.	No.	Yes.
3,6-diazaoctanethylenediamin	1 - 10	No.	No.	No.	Yes.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	silver	7440-22-4	60 - 90
Supplier notification	silver	7440-22-4	60 - 90

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: SILVER; TRIETHYLENETETRAMINE

New York : The following components are listed: Silver

New Jersey : The following components are listed: SILVER; TRIETHYLENE TETRAMINE; 1, 2-ETHANEDIAMINE, N,N'-BIS(2-AMINOETHYL)-

Pennsylvania : The following components are listed: SILVER; 1,2-ETHANEDIAMINE, N,N'-BIS (2-AMINOETHYL)-

Canada inventory : All components are listed or exempted.

15. Regulatory information

International regulations

International lists

- : **Australia inventory (AICS)**: All components are listed or exempted.
- : **China inventory (IECSC)**: All components are listed or exempted.
- : **Japan inventory**: Not determined.
- : **Korea inventory**: All components are listed or exempted.
- : **Malaysia Inventory (EHS Register)**: Not determined.
- : **New Zealand Inventory of Chemicals (NZIoC)**: All components are listed or exempted.
- : **Philippines inventory (PICCS)**: All components are listed or exempted.
- : **Taiwan inventory (CSNN)**: Not determined.

Chemical Weapons

- : Not listed

Convention List Schedule I Chemicals

Chemical Weapons

- : Not listed

Convention List Schedule II Chemicals

Chemical Weapons

- : Not listed

Convention List Schedule III Chemicals

16. Other information

Label requirements

- : CAUSES EYE AND SKIN BURNS. HARMFUL IF ABSORBED THROUGH SKIN. CAUSES RESPIRATORY TRACT IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION.

Hazardous Material

Information System (U.S.A.)

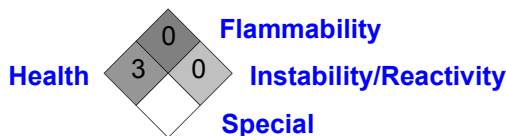
Health	3
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection

Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

16. Other information

Date of issue

06/23/2023

▣ Indicates information that has changed from previously issued version.

Disclaimer

The information presented is believed to be correct and is the most accurate information available to us at this time. However, Ladd Research makes no warranty, express or implied, and assumes no liability for this information and the product described herein.