Safety Data Sheet
Product: D-1931B

Version: 1 (US)
Revision Date: August 4, 2015
Prepared in Accordance with: 29CFR 1910.1200

Section 1: Company and Product Identification

Synonym / Other ID / Description: none assigned
Product Use: Cure side for Conductive Adhesive
Restrictions on Use: Industrial only. Not for consumer use.
Company: **Engineered Materials Systems, Inc.**
132 Johnson Drive
Delaware, Ohio 43015
Telephone: **740-362-4444** (for product information, weekdays 8 a.m.-5 p.m. E.S.T.)
Emergency 24-hr Telephone Number: 1-800-424-9300 (Chemtrec)
703-527-3887 (Chemtrec—International)

Section 2: Hazards Identification

Sample Preparation/Mixture classification:

GHS Classification: 29 CFR1910.1200 (d)	
	Signal Word: Danger
Hazard classification(s)	**Hazard phrases**
Acute toxicity oral 3	**H301:** Toxic if swallowed
Acute toxicity dermal 4	**H312:** Harmful in contact with skin
Skin corrosion/irritation 1B	**H314:** Causes severe skin burns and eye damage
Skin sensitization 1	**H317:** May cause an allergic skin reaction
Serious eye damage /irritation 1	**H318:** Causes serious eye damage
Acute toxicity inhalation 2	**H330:** Fatal if inhaled
Specific target organ toxicity – Single Exposure 3	**H335:** May cause respiratory irritation
Aquatic acute toxicity 3	**H402:** Harmful to aquatic life
Precautionary Statement (s)	
PREVENTION:	
P260: Do not breathe dust/fume/gas/mist/ vapors/spray.	
P264: Wash hands and face thoroughly after handling	
P270: Do not eat, drink or smoke when using this product	
P271: Use only outdoors or in a well-ventilated area.	
P272: Contaminated work clothing should not be allowed out of the workplace	
P273: Avoid release to the environment.	
P280: Wear protective gloves/protective clothing/eye protection/face protection	
P284: Wear respiratory protection.	
RESPONSE:	
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician	
P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting	
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.	
P303 + P361 + P353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with was/shower.	
P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.	
P305 + P351 + P338: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.	

P310: Immediately call a POISON CENTER or doctor/physician
P312: Call a POISON CENTER or doctor/physician if you feel unwell.
P320: Specific treatment is urgent: See First Aid section of this SDS.
P322: Specific Treatment: See First Aid section of this SDS.
P330: Rinse mouth
P333 + P313: If skin irritation or rash occurs: Get medical advice/attention
P362: Take off contaminated clothing and wash it before reuse.
STORAGE:
P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up
DISPOSAL:
P501: Dispose of contents/container as hazardous waste to an approved waste facility in accordance with local/regional/national/international regulations

Hazards Not Otherwise Classified (HNOC): No further hazards known

Section 3: Composition and information on Hazardous Ingredients

Ingredient	CAS #	% Weight
Bisphenol A-epichlorohydrin-diethylenetriamine copolymer	31326-29-1	60-90*
Diethylenetriamine	111-40-0	20-40*

*Indicates components for which the specific chemical identity or exact percentage has been withheld as a trade secret

Section 4: First Aid Measures

General Advice: First aid responders should pay attention to self-protection and use the recommended protective clothing.
Eye Contact: Wash immediately and continuously with flowing water for at least 30 minutes while holding eyelids open. Check for and remove any contact lenses after first 5 minutes and continue washing. Get medical attention, preferably from an ophthalmologist. Suitable emergency eyewash facility should be immediately available.
Skin Contact: Immediate continued and thorough washing in flowing water for at least 30 minutes is imperative while removing contaminated clothing. Prompt medical attention is essential. Wash clothing before re-use. Properly dispose of leather items such as shoes, belts, and watchbands. Suitable safety shower facility should be immediately available.
Ingestion: Do not induce vomiting. Give one cup (8 oz. or 240 ml) of water or milk if available and transport to medical facility. Never give anything by mouth to a drowsy, unconscious, or convulsing person.
Inhalation: Remove victim to fresh air. Provide oxygen if breathing is difficult. Give artificial respiration if not breathing. Use rescuer protection (pocket mask, etc.) Immediately call poison center or doctor/physician. See notes to physician below.

Most Important Symptoms/Effects (Acute and Delayed):
Inhalation: Irritation/burning/asthma-like symptoms, severe irritation to nose and throat, salivation
Skin Contact: Irritation/burning, pain redness, tissue damage; May cause skin sensitization characterized by rashes or hives in predisposed individuals.
Eye Contact: Irritation/burning; May cause severe irritation with corneal burning, which may result in permanent impairment of vision, even blindness; Chemical burns may occur.
Ingestion: Irritation/burning; Swallowing may result in burns of the mouth and throat, gastrointestinal irritation or ulceration.

Notes to physician: Maintain adequate ventilation and oxygenation of the patient. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives, and corticosteroids may be of help. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach, and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. No specific antidote. Treatment of exposure should be directed at the control of

symptoms and the clinical condition of the patient. Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome).

Special Hazards: No further hazards identified.

Section 5: Fire Fighting Measures

Suitable Extinguishing Media: CO_2, dry chemical, water fog, foam
Unsuitable Extinguishing Media: Water stream

Specific Fire or Explosion Hazards: Toxic or irritating fumes may develop when material is exposed to open flame or extreme temperatures. Combustion products may include and are not limited to: phenolics, nitrogen oxides, carbon monoxide, carbon dioxide.

Special Fire Fighting Procedures:

Protective Equipment: Firefighters/rescue personnel should wear positive pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing. If contact with this material is likely, use full chemical resistant firefighting clothing with SCBA.

Precautions:

Keep people away.
Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles.
Use water spray to cool fire exposed containers and fire affected zones until fire is out and danger of re-ignition has passed.

Environmental Precautions:

Contain fire water run-off to prevent potential environmental damage.

Section 6: Accidental Release Measures

NOTE: Review the entire SDS before proceeding with spill response.

Personal Precautions and Protective Equipment: Ensure adequate ventilation. Keep non-responder personnel at a safe distance and upwind of spill. See handling information in Section 7.

Emergency Procedures:

Spills: Shut off source of the release if this can be done without risk of injury. Dike area to contain the spill and prevent releases to soil, sewers, drains, or other waterways. Collect spilled material for salvage or disposal. Wipe up or absorb spilled material that cannot be recovered, using inert absorbent material. Wash area with soapy water, while containing runoff. Collect and dispose contaminated materials in accordance with current Federal, State, local and Country regulations.

Section 7: Handling and Storage

NOTE: Employees must be properly trained in safe handling of this product prior to use.

Handling
General information on handling:
Avoid breathing vapor or mist.
Avoid contact with skin.
Wash thoroughly after handling.
Emptied container retains vapor and product residue.
Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Storage
General information on storage conditions:
Store in a cool, dry location with adequate ventilation. Store in closed containers, in a secure area to prevent container damage and subsequent spillage. Keep container tightly sealed when not in use. Keep away from open flames and heat sources. Consult the product Technical Bulletin for detailed storage information.

Storage stability – Remarks: Exposure to elevated temperature can cause product to decompose. Reaction with CO2 may form an amine carbamate.
Storage incompatibility – General: Product absorbs CO2 from the air.
Store separate from: Avoid moisture. Avoid contact with acids, acrylates, alcohols, aldehydes, halogenated hydrocarbons, ketones, nitrites, metals such as brass, bronze, copper/copper alloys. Avoid contact with absorbent materials such as ground corn cobs, moist organic absorbents, peat moss, sawdust.

Temperature tolerance: See Technical Data Sheet

Section 8: Exposure Control / Personal Protection

Personal Protection:
General precautions: Wash hands and face thoroughly after handling this product and before eating, drinking, or smoking. Emergency eye wash facilities and safety shower should be available.

Eye protection: This product causes serious eye damage. Prevent eye contact through the use of chemical safety glasses, splash-proof goggles, or face shields.

Skin protection: This product cause severe skin burns and may cause allergic skin reactions. Wear appropriate gloves that are rated for chemical resistance and breakthrough. Examples of preferred glove materials include : ethyl vinyl laminate (EVAL), polyethylene. Examples of acceptable materials include: Viton, butyl rubber, Neoprene, natural rubber (latex), polyvinyl chloride (PVC), nitrile/butadiene rubber (nitrile or NBR), polyvinyl alcohol (PVA). Change gloves frequently during use and watch for signs of degradation/ breakthrough. If necessary, a proper chemical resistant apron and additional impervious protective equipment should be used to prevent skin contact and contamination of clothing. Normal work clothing should be washed before re-use.

Respiratory Protection: Provide effective ventilation to draw emissions away from the worker and prevent routine inhalation. Use an appropriate, properly fitted respirator if exposures exceed PEL/TLV/OEL value listed below. The type of protection selected (SCBA, air purifying, etc.) will depend upon the conditions of use. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Ingestion: Keep product away from food and beverages. Wash hands and face thoroughly after handling this product and before eating, drinking, or smoking.

Occupational Exposure Limits (OELs):

Material	OSHA PEL	ACGIH TLV
Diethylenetriamine	Not determined	1 ppm TWA

Section 9: Physical and Chemical Properties

Appearance: Liquid
Color: Yellow
Odor: amine
Odor Threshold: Not available
pH: Not applicable
Melting Point (°C): Not applicable
Boiling Point (°C): > 100 °C

Flash point: 105°C (221 °F) closed cup
Lower explosion Limit: Not determined for this preparation/mixture
Upper explosion Limit: Not determined for this preparation/mixture
Evaporation rate: Not available
Vapor Pressure: Not available
Vapor density: Not available
Specific Gravity/Density: Not available
Solubility: Not available
Partition coefficient: n-octanol/water: Not available
Auto-ignition temperature [NFPA]: Not available
Explosive properties and Oxidizing properties: Refer to Section 10: Stability and Reactivity

Section 10: Stability and Reactivity

Reactivity:	Reaction with CO2 may form an amine carbamate. Product absorbs CO2 from the air.
Chemical Stability:	Thermally stable at typical use temperatures
Conditions to avoid:	Exposure to elevated temperature can cause product to decompose. Avoid moisture.
Incompatible materials:	Avoid contact with acids, acrylates, alcohols, aldehydes, halogenated hydrocarbons, ketones, nitrites, metals such as brass, bronze, copper/copper alloys. Avoid contact with absorbent materials such as ground corn cobs, moist organic absorbents, peat moss, sawdust.
Hazardous Decomposition Products:	May include and are not limited to: ammonia, ethylenediamine, phenolics, volatile amines

Section 11: Toxicological Information

Routes of Exposure: Eyes, Skin, Inhalation, Ingestion
Symptoms of Exposure:
Inhalation: Irritation/burning/asthma-like symptoms, severe irritation to nose and throat, salivation
Skin Contact: Irritation/burning, pain redness, tissue damage; May cause skin sensitization characterized by rashes or hives in predisposed individuals.
Eye Contact: Irritation/burning; May cause severe irritation with corneal burning, which may result in permanent impairment of vision, even blindness; Chemical burns may occur.
Ingestion: Irritation/burning; Swallowing may result in burns of the mouth and throat, gastrointestinal irritation or ulceration.

Acute Toxicity Effects Data: Not determined for this preparation/mixture.
Component information:

Chemical name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LD_{50} (rat)
Bisphenol A-epichlorohydrin-diethylenetriamine copolymer	540 mg/kg (Source: NLM_CIP)	No data available	No data available
Diethylenetriamine	1080 mg/kg (Source: JAPAN_GHS)	672 mg/kg (Source: JAPAN_GHS)	70 mg/L 4 h (vapor, Source: JAPAN_GHS)

0% of this product is of unknown acute oral toxicity.

Irritation Effects Data:
Skin irritation: Prolonged contact may cause skin irritation with local redness. Repeated contact may cause skin irritation with local redness.
Eye irritation: Based on available data, the classification criteria are not met.
Skin sensitization: For similar material(s): Has caused allergic skin reactions when tested in guinea pigs.

Component information: (From Manufacturers' Safety Data Sheets) No data available

Chronic toxicity or effects from long term exposures:

Carcinogenicity: No components of this product, present at levels greater than or equal to 0.1%, are identified a Carcinogen per IARC, ACGIH, NTP, or OSHA

Reproductive effects: No data available.

Mutagenicity: No data available

Specific Toxic Organ Toxicity:
Single Exposure: Based on available data, the classification criteria are not met.
Repeated Exposure: Based on available data, the classification criteria are not met.

Section 12: Ecological Information

Not determined for this preparation/mixture. Follow spill and disposal recommendations.

Component information:

Biodegradability: Not determined for this preparation/mixture.
Bioaccumulation: Not determined for this preparation/mixture.
Ecotoxicity effects: Not determined for this preparation/mixture.
Persistence and degradability: Not determined for this preparation/mixture.
Mobility in soil: Not determined for this preparation/mixture.

Ecotoxicity effects for components:

Component	Species	Test	Result Type	Data
Bisphenol A-epichlorohydrin-diethylenetriamine copolymer	poecilia reticulata	semi-static, 96 hr	LC50	430 mg/L
	daphnia magna	static, 48 hr, DIN 38412	EC50	16 mg/L
	pseudokirchineriella subcapatata	static, 72 hr, OECD 201	ErC50	1164 mg/L
	fish	semi-static, 28 d, growth	NOEC	>10 mg/L
	daphnia magna	semi-static, 21d, no. of offspring	NOEC	5.6 mg/L
	daphnia magna	semi-static, 21d, no. of offspring	MATC	7.95 mg/L
Diethylenetriamine	(SDS lists same data as for 31326-29-1, plus bacteria)			
	bacteria	static, 16 hr	EC50	>5000 mg/L

Other environmental fate data for components:

Component	Species	Test	Result Type
PERSISTENCE AND DEGRADABILITY			
Bisphenol A-epichlorohydrin-diethylenetriamine copolymer	Biodegradability	reaches > 70% mineralization in OECD tests for inderent biodegradability	
	Biodegradation	>96%	
	Exposure time	10 d	
Diethylenetriamine	same data as above, plus the following:		
	Theoretical Oxygen Demand	3.42 mg/kg	
	BOD	Incubation Time (days)	BOD %
		5	23
		10	46
		20	70
	Photodegradation	Sensitizer	OH radicals
		Atmospheric half-life	0.87 hr
		Method	estimated
BIOACCUMULATION POTENTIAL			
Bisphenol A-epichlorohydrin-diethylenetriamine copolymer	Bioaccumulation	Low potential (BCF<100 or Log Pow<3)	
	Partition coefficient	n-octanol/water (log Pow)	-1.58 at 20C, estimated
	Bioaccumulation factor (BCF)	<0.3, measured	
Diethylenetriamine	(SDS lists same data as for 31326-29-1)		
MOBILITY IN SOIL			
Bisphenol A-epichlorohydrin-diethylenetriamine copolymer	Expect relatively immobile in soil (Koc>5000)		
	Partition coefficient (Koc)	19,111 estimated	
Diethylenetriamine	same data as above, plus the following:		
	Very low Henry's constant. Volatilization from natural bodies of water or moist soil is not expected to be an important fate process.		

Section 13: Disposal Considerations

Waste Disposal: Comply with all current Federal, State, local or Country regulations.

Section 14: Transport Information

D.O.T. Classification: Classified for transport.
Shipping Name: Diethylenetriamine solution
UN/NA Number: UN2079
Packing Group: II

Shipping Label: Corrosive
IATA/IMDG Classification: Classified for transport.
Shipping Name: Diethylenetriamine solution
UN/NA Number: UN2079
Packing Group: II
Shipping Label: Corrosive

Severe Marine Pollutant or potential Marine Pollutant: (49 CFR § 172.101 Appendix B) No

Section 15: Regulatory Information

TSCA Status: All components of this product are listed in the EPA Toxic Substance Control Act Inventory. No components are listed under TSCA Section 4 or 5 nor are subject to a TSCA 12 (b) Export Notification.

EPA SARA Title III Chemical Listings

Section 302 Extremely Hazardous Substances: None

Section 304 CERCLA Hazardous Substances: None

Section 311/312 Hazard Class(es):
Acute: Yes
Chronic: Yes
Fire: No
Pressure: No
Reactive: No

Section 313 Toxic Chemicals: None

Chemical Inventories: All components of this product are listed or in compliance with the following global chemical inventories

Australian Inventory of Chemical Substances (AICS)
Canadian Domestic Substance List (DSL) or Non-Domestic Substance List (NDSL)
China. Inventory of Existing Chemical Substances
European Inventory of Existing Commercial Substances (EINECS), No Longer Polymers list (NLP) —or—
European Chemicals Agency (ECHA) Pre-registered Substance List
Korean Existing Chemicals Inventory (KECL)
Japan. Japan Existing and New Chemical Substances (ENCS) Kashin-Hou Law List
Philippines - Inventory of Chemicals and Chemical Substances (PICCS)

State Right to Know (RTK) lists: Available upon request

Canada Workplace Hazardous Information System (WHMIS) Classification: D1A, D1B, D2A, D2B, E

Section 16: Additional Information

SDS preparation: Engineered Materials System, Inc.
Preparer: Safety and Compliance Manager
Contact # 1-740-362-4444
Email: kclark@emsadhesives,com

Version Number:	Revision Date	Revisions:
0	October 2005	Original issue

0	August 4, 2015	Updated to GHS format

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