



SAFETY DATA SHEET

EBS-2X GRAPHITE ADHESIVE PART 1

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name: EBS-2X Part 1

Other Names: Graphite Adhesive
Two part high temperature graphite adhesive

Product Code: Modified Resin: Part 1 of 2

Primary Use: Graphite Adhesive used for bonding, filling, and repairing graphite or CFC

Secondary Use: Sacrificial coating in high temperature application, as a electrostatically-dissipative coating in power generation and transmission applications as well as a conductive coating/ adhesive for electrochemical and electronics applications.

Distributor: Manufactured exclusively for,
CeraMaterials
525 Silver Lake Rd
Dingmans Ferry, PA 18328
Emergency Contact: Jerry Weinstein
Product Stewardship: 518.701.6722
E-Mail: sales@ceramaterials.com

Manufacturer: Astro Chemical Company, Inc
PO Box 1250, 3 Mill Road Extension
Ballston Lake, NY 12019
Product Stewardship: 518.399.5338
E-Mail: sales@astrochemical.com

24hr Emergency Contact Info:

CHEMTREC US Transportation: 800.424.9300

CHEMTREC International Transportation: 703.741.5500



SECTION 2 - HAZARDS IDENTIFICATION

GHS Classifications.

Health:

Skin Sensitization, Category 1

Skin Corrosion, Category 2

Eye irritation, Category 2

Environmental:

Chronic hazard to the Aquatic Environment, Category 2

Signal word, symbols, hazard and precautionary statements:

Hazard Pictogram



Signal Word

Warning

Hazard Statements

H315: Causes skin irritation.

H137: May cause an allergic skin reaction.

H139: Causes serious eye irritation.

H411: Toxic to aquatic life with long lasting effects.

Precautionary Statements

Prevention:

P261: Avoid breathing dust/fume/gas/mist/vapours/spray.

P264: Wash ... thoroughly after handling.

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.

Response:

P302+P352: If on skin: Wash with plenty of water/ ...



- P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
- P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do so. Continue rinsing.
- P337+P313: If eye irritation persists: Get medical advice/attention.
- P363: Wash contaminated clothing before reuse.
- P391: Collect spillage.

Storage:

2852PQUO: Not prescribed.

Disposal:

7451FZ1V: Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazards not otherwise classified: Not available.

Emergency Overview:

Physical Appearance: Liquid

Immediate Concerns: May be slightly toxic and may be harmful if swallowed. May cause skin sensitization. May possibly cause pulmonary sensitization. May be irritating to the eyes and skin.

Potential Health Effects:

- Eyes: Contact may cause eye irritation.
- Skin: Irritating to skin. May cause sensitization by skin contact.
- Skin Absorption: Not available.
- Ingestion: May be slightly toxic and may be harmful if swallowed.
- Inhalation: Slightly irritating to the respiratory system.

Reproductive Toxicity:

Reproductive effects: Refer to Section 11 for additional information.
Teratogenic effects: Not available.

Carcinogenicity: Refer to section 11 for additional details regarding this statement.

Mutagenicity: Not available.

Medical Conditions Aggravated: Pre-existing skin disorders may be aggravated by over-exposure to this product.

**SECTION 3 - COMPOSITION**

<u>Chemical & Common Name</u>	<u>CAS#</u>	<u>% By Weight</u>
Organic Filler (1)	Trade Secret	30 - 60
Resin (1)	Trade Secret	20 - 40
1, 3-bis(2, 3-epoxypropoxy)-2, 2-dimethylpropane	17557-23-2	5 - 15
Carbon Black	1333-86-4	5 - 15

SECTION 4 - FIRST AID MEASURES

Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin, and eye contact, and ingestion.

Eyes:

In case of eye contact immediately flush abundantly with water; have eye bath available if possible. Do not rub eyes. Get medical attention, if irritation persists.

Skin:

In case of skin contact, wash affected areas with soap and water. Get medical attention, if irritation persists.

Ingestion:

Get immediate medical attention. Do not induce vomiting unless instructed to do so by a poison center or physician.

Inhalation:

Move exposed person to fresh air. Keep person warm and at rest. If breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention if adverse health effects persist or are severe.

Signs and symptoms of overexposure.

Eyes:

Adverse symptoms may include the following: pain, irritation, watering, and/or redness.

Skin:

Adverse symptoms may include the following: irritation and/or redness.



Skin Absorption:

Not available.

Ingestion:

Not available

Inhalation:

Adverse symptoms may include the following: respiratory tract irritation, coughing.

Acute effects:

Not available.

Chronic effects:

Not available.

Notes to Physicians:

Treatment is symptomatic and supportive.

SECTION 5 - FIRE FIGHTING MEASURES

Extinguishing media.

Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this materials.

Hazardous combustion products.

Decomposition products may include the following materials: Carbon oxides.

Explosion hazards.

If in fire or if heated, a pressure increase will occur and the container may burst.

Fire fighting procedures.

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire.

Fire fighting equipment.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.



Fire explosion.

Not available.

Sensitive to static discharge.

Not available

Sensitivity to Impact.

Not available

Hazardous decomposition products.

Not available.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Small Spill.

Stop leak if without risk. Move containers from spill area. Vacuum or sweep up material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.

Environmental precautions.

Water spill: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers. Inform relevant authorities if the product has caused environmental pollution (sewers, waterways, soil, or air).

General procedures.

Do not touch or walk through spilled material. Use appropriate personal protective equipment.

SECTION 7 - HANDLING AND STORAGE

Handling.

Put on appropriate personal protective equipment. Eating, drinking, and smoking should be prohibited where this material handled, stored and processed. Workers should wash hands and face before eating, drinking, and smoking. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Empty containers retain product residue and can be hazardous. Do not reuse container. Refer to Section 8 for additional information.

Storage.

Store in accordance with local regulations. Store in original container protected from direct



sunlight in a dry, cool, and well-ventilated area. Keep container tightly closed and sealed until ready to use.

Storage temperature.

Store in accordance with local regulations. Store in original container in a dry, cool and well-ventilated area. Do not store in unlabeled containers.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available.

OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)

Chemical Name	EXPOSURE LIMITS			
	Type		ppm	mg/m ³
Organic Filler (1)	OSHA PEL	TWA	Not available ^[1]	5 ^[1]
	ACGIH TLV	TWA	Not available ^[2]	2 ^[2]
	Supplier OEL	TWA	Not available	Not available
Resin (1)	OSHA PEL	TWA	Not established	Not established
		STEL	Not established	Not established
	ACGIH TLV	TWA	Not established	Not established
		STEL	Not established	Not established
	Supplier OEL	TWA	Not established	Not established
		STEL	Not established	Not established
1,3-bis(2, 3-epoxypropoxy)-2, 2-dimethylpropane	OSHA PEL	TWA	Not established	Not established
	ACGIH TLV	TWA	Not established	Not established
	Supplier OEL	TWA	Not established	Not established
Carbon Black	OSHA PEL	TWA	Not available ^[1]	3.5 ^[1]
	ACGIH TLV	TWA	Not available ^[2]	3.5 ^[2]
	Supplier OEL	TWA	Not available	Not available

Footnotes:
1. Respirable dust
2. Respirable fraction

Engineering controls.

Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapors or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep workers exposure to airborne contaminants below any recommended or statutory limits.

Individual protection measures, such as personal protective equipment.

**Eyes and face:**

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, gases or dusts. As necessary, wear goggles or safety glasses with side shields.

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.

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.

Protective Clothing:

Long sleeves, long trousers to protect skin from contact.

Work hygienic practices:

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. Ensure that eyewash stations and safety showers are close to the workstation.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Viscous Liquid	Vapor density:	> 1
Appearance:	Black liquid	Boiling point:	Not available
Odor:	Not available	Freezing point:	Not available
Odor threshold:	Not available	Thermal decomposition:	Not available
pH:	Not available	Solubility in water:	Negligible
Percent volatile:	Not available	Evaporation rate:	Not available
Flash point and method:	> 93°C (200°F) Setaflash	Specific gravity:	1.2 to 1.50
Flammable limits:	Not available	Viscosity:	Not available
Autoignition temperature:	Not determined	Oxidizing properties:	Not available
Vapor pressure:	Negligible	Partition coefficient (n-octanol/water):	Not available



SECTION 10 - STABILITY AND REACTIVITY

Reactivity:	Stable under normal conditions.
Hazardous polymerization:	No
Stability:	This product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid:	Oxidizing materials.
Possibility of hazardous reactions:	Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous decomposition products:	Carbon monoxide, aldehydes, and acids.
Incompatible materials:	Reactive or incompatible with the following materials: oxidizing materials, strong acids, and strong alkalis.

SECTION 11 - TOXICOLOGICAL INFORMATION

<u>Chemical Name</u>	<u>Oral LD₅₀ (rat)</u>	<u>Dermal LD₅₀ (rabbit)</u>	<u>Inhalation LC₅₀ (rat)</u>
Organic Filler (1)	> 2000 mg/kg Rat	No data available	> 2 mg/l/4hr
Resin (1)	~ 30000 mg/kg Rat	> 2000 mg/kg Rat	No data available
1,3-bis(2,3-epoxypropoxy)-2, 2-dimethylpropane	4500 mg/kg Rat	> 2000 mg/kg Rat	No data available
Carbon Black	> 5000 mg/kg Rat	> 3000 mg/kg Rabbit	No data available

Skin corrosion / irritation:

Not available.

Serious eye damage / irritation:

In an OECD No. 404 study conducted on the rabbit with a 4 hr occlusive exposure scores for erythema and oedema were minimal. Therefore, this material is not a skin irritant. In other studies conducted with the rabbit a 4 hr occlusive exposure was used. Maximum erythema and oedema scores observed under these extreme conditions were 1.5-2 and 1-1.5 respectively.



Respiratory or skin sensitization:

Has caused allergic skin reactions in humans. Did not cause allergic skin reactions when tested in mice.

Germ cell mutagenicity:

Not available.

Carcinogenicity:

<u>Chemical Name</u>	<u>NTP Status</u>	<u>IARC Status</u>	<u>OSHA Status</u>
Organic Filler (1)	Not listed	Not classified	Not regulated
Resin (1)	Not listed	Not classified	Not regulated
1,3-bis(2,3-epoxypropoxy)-2, 2-dimethylpropane	Not listed	Not classified	Not regulated
Carbon Black	Not listed	Group 2B	Not regulated

Notes:

Carbon Black is not designated a carcinogen by the U.S. National Toxicology Program (NTP) or the U.S. Occupational Safety and Health Administration (OSHA). IARC concluded that there is sufficient evidence in experimental animals for the carcinogenicity of carbon black and that carbon black is possibly carcinogenic to humans.

Reproductive toxicity:

No adverse reproductive effects were observed in an OECD Test Guideline no. 416 GLP two-generation rat oral gavage study conducted up to a high dose level of 750 mg/kg/day that resulted in adult body weight decrements.

STOT-Repeated exposure:

Except for skin sensitization, repeated exposures to low molecular weight epoxy resins of this type are not anticipated to cause any significant adverse effects.

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Data:

Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5). Potential for mobility in soil is low (Koc between 500 and 2000). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

Henry's Law Constant (H): $\leq 6.94E-09$ atm*m³/mole; 25C Estimated.

Partition coefficient, n-octanol/water (log Pow): 3.7-3.9 Measured.

Partition coefficient, soil organic carbon/water (Koc): 1,800 - 4,440 Estimated.



Ecotoxicological Information: Material is toxic to aquatic organisms (LC50 / EC50 / IC50 between 1 and 10 mg/L in the most sensitive species).

Bioaccumulation / Accumulation: Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

OECD Biodegradation Tests:
Biodegradation = 12%; Exposure Time = 28d; Method = OECD 302B Test

Distribution: Not available.

Aquatic Toxicity (Acute):

96-Hour LC₅₀:	3.1 [mg/L]; 96 hr; Fathead minnow (<i>Pimephales promelas</i>)
48-Hour EC₅₀:	~ 1.5 [mg/L]; 48 hr; water flea <i>Daphnia magna</i>
96-Hour EC₅₀:	Not available

Notes: Based on component(s).

Chemical Fate Information: Not available.

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal Method:

The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. 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. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Product Disposal:

Any disposal practice must be in compliance with all local and national laws and regulations. Do not dump into any sewers, on the ground, or into any body of water.

Empty Container:

Empty containers or lines may retain some product residues. This material and its container must be disposed of in a safe way.

SECTION 14 - TRANSPORT INFORMATION

DOT (Department of Transportation)

Proper Shipping Name:	Environmentally hazardous substance, Liquid, N.O.S.
Technical Name:	Bisphenol A Epoxy Resin
Primary Hazard Class / Division:	9
UN / NA Number:	3082



Packing Group:	III
NAERG:	171
Reportable Quantity (RQ) Under CERCLA:	No
U.S. Surface Freight Class:	Non-Restricted as per 49 CFR 171.4 (Rev. Oct 2014).
Bulk Freight Class:	Fully regulated in bulk quantities.
Placards:	Placards required for Bulk shipments only.
Label:	Class 9; Environmentally Hazardous Label.
Marine Pollutant #1:	Yes
<u>Air (ICAO / IATA)</u>	
Shipping Name:	Environmentally hazardous substance, Liquid, N.O.S.
Technical Name:	Bisphenol A Epoxy Resin
UN / NA Number:	3082
Primary Hazard Class / Division:	9
Packing Group:	III
ERG:	171
Subsidiary Risk:	NA = Not applicable
Special Provisions:	A97; A158; A197
Placards:	Required for Bulk packaging only.
Label:	Class 9; Environmentally Hazardous label.
Note:	As per IATA 56 th Edition Special Provision A197, packages with inners containing 5 liters or less may be shipped as Non-Restricted when the packaging requirements of this Code have been satisfied.
<u>Vessel (IMO / IMDG):</u>	
Shipping Name:	Environmentally hazardous substance, Liquid, N.O.S.
Technical Name:	Bisphenol A Epoxy Resin
UN / NA Number:	3082
Primary Hazard Class / Division:	9
Packing Group:	II
Limited Quantity:	Yes
EmS:	F-A, S-F
Marine Pollutant #1:	Yes
Placards:	Required for Bulk Containers and CPU's.
Label:	Class 9; Environmentally Hazardous Label
Special Provisions:	274; 335; 969
Note:	Non-restricted as per IMDG 2014 Edition Section 2.10.2.7 in quantities of 5 liters or less per inner when packaging requirements of Code are met.
<u>Comments:</u>	The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.



SECTION 15 - REGULATORY INFORMATION

United States Regulations:

SARA Title III (Superfund Amendments and Reauthorization Act):

Fire: No
 Pressure Generating: No
 Reactivity: No
 Acute: Yes
 Chronic: Yes

313 Reportable Ingredients: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title II, Section 313.

CERCLA (Comprehensive Response, Compensation, and Liability Act):
EPA:

CERCLA Regulatory: None above reporting de minimis.

TSCA (Toxic Substance Control Act):

EPA RQ Ingredient: Not available.

California Proposition 65:

TSCA Status: All components are listed or exempted (TSCA 8b).

This product contains a chemical known in the State of California to cause cancer.

Canadian Regulations:

WHMIS Hazard Symbol and Classification:



WHMIS (Workplace Hazardous Materials Information System):

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by the Controlled Products Regulations.

WHMIS Class:

Class D-2B: Material causing other toxic effects (Toxic).

Domestic Substance List (Inventory):

The ingredients of this product are listed on the Domestic Substance List, Non-Domestic Substance List or are exempt.

SECTION 16 - OTHER INFORMATION

Effective Date: March 3, 2016 Revision Date: 1/6/2020
 Revision Summary: Company Information updated. SDS Prepared By: CeraMaterials

Manufacturer Supplemental Notes: Information Phone Number: (518) 399-5338

Additional SDS Information: Safety Data Sheet prepared in accordance with UNECE Globally Harmonized System of Classification and Labeling of Chemicals (GHS) Fourth revision edition.

Disclaimer: The information provided herein was believed by Astro Chemical Company, Inc and CeraMaterials to be accurate at the time of preparation or prepared from sources believe to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of this product and to determine the suitability of the product for its intended use.



SAFETY DATA SHEET

EBS-2X GRAPHITE ADHESIVE PART 2

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name: EBS-2X Part 2

Other Names: Graphite Adhesive Catalyst
Two part high temperature graphite adhesive catalyst

Product Code: Modified Resin Catalyst: Part 2 of 2

Primary Use: Part 2 Catalyst for CeraMaterials' EBS-2X Graphite Adhesive which is used for bonding, filling, and repairing graphite or CFC.

Secondary Use: EBS-2X can be used for a Sacrificial coating in high temperature applications, as a electrostatically-dissipative coating in power generation and transmission applications as well as a conductive coating/ adhesive for electrochemical and electronics applications.

Distributor: Manufactured exclusively for,
CeraMaterials
525 Silver Lake Rd
Dingmans Ferry, PA 18328
Emergency Contact: Jerry Weinstein
Product Stewardship: 518.701.6722
E-Mail: sales@ceramaterials.com

Manufacturer: Astro Chemical Company, Inc
PO Box 1250, 3 Mill Road Extension
Ballston Lake, NY 12019
Product Stewardship: 518.399.5338
E-Mail: sales@astrochemical.com

24hr Emergency Contact Info:

CHEMTREC US Transportation: 800.424.9300

CHEMTREC International Transportation: 703.741.5500



SECTION 2 - HAZARDS IDENTIFICATION

GHS Classifications.

Health:

- Skin Corrosion, Category 1A
- Serious Eye Damage, Category 1
- Respiratory Sensitization, Category 1
- Skin Sensitization, Category 1
- Reproductive Toxicity, Category 2
- Target Organ Toxicity (Single exposure), Category 1
- Target Organ Toxicity (Repeated exposure), Category 1

Signal word, symbols, hazard and precautionary statements:

Hazard Pictogram



Signal Word

Danger

Hazard Statements

- H314: Causes severe skin burns and eye damage.
- H317: May cause an allergic skin reaction.
- H318: Causes serious eye damage.
- H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- H361: Suspected of damaging fertility or the unborn child (state specific effect if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard).
- H370: Causes damage to the organs (or state all organs affected, if known) (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard.)
- H372: Causes damage to organs (state all organs affected, if known) through prolonged or repeated exposure (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard).



Precautionary Statements

Prevention:

- P201: Obtain special instructions before use.
- P202: Do not handle until all safety precautions have been read and understood.
- P261: Avoid breathing dust / fume / gas / mist / vapors / spray.
- P264: Wash ... thoroughly after handling.
- P272: Contaminated work clothing should not be allowed out of the workplace.
- P280: Wear protective gloves / protective clothing / eye protection / face protection.
- P285: In case of inadequate ventilation wear respiratory protection.

Response:

- P301+P330+P331: If swallowed: rinse mouth, Do Not induce vomiting.
- P303+P361+P353: If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
- P304+P340: If inhaled: Remove person to fresh air and keep comfortable for breathing.
- P342+P311: If experiencing respiratory symptoms: Call a poison center/doctor/...
- P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continuing rinsing.
- P333+P313: If skin irritation or rash occurs: Get medical advice / attention.
- P363: Wash contaminated clothing before reuse.
- P308+P313: If exposed or concerned: Get medical advice / attention.

Storage:

- P403+P233: Store in a well-ventilated place. Keep container tightly closed.
- P405: Store locked up.

Disposal:

- 8609XSZZ: P501: Dispose of contents/container in accordance with local / regional / national / international regulations.

Hazards not otherwise classified: Not available.

Emergency Overview:

Physical Appearance: Liquid

Immediate Concerns: May be toxic if absorbed through skin. May be moderately toxic if swallowed. Corrosive to the eyes. Corrosive to the skin. Vapor / mists may be corrosive to upper respiratory tract. Corrosive to mouth, throat and stomach. May cause skin sensitization.

**Potential Health Effects:**

Eyes: Corrosive, contact causes severe eye burns.
Skin: Contact causes severe skin irritation and possible burns.
Skin Absorption: Not available.
Ingestion: If ingested, severe burns of the mouth and throat, as well as danger of perforation of the oesophagus and the stomach. Harmful if swallowed.
Inhalation: Harmful if inhaled and may cause delayed lung injury. Can cause severe eye, skin and respiratory tract burns. Risk of serious damage to the lungs (by inhalation). May cause nose, throat, and lung irritation.

Reproductive Toxicity:

Reproductive effects: Refer to Section 11 for additional information.
Teratogenic effects: Not available.

Carcinogenicity: This product or one of its ingredients present at 0.1% or more is not listed as a carcinogen or suspected carcinogen by NTP, IARC or OSHA.

Mutagenicity: Not available.

Medical Conditions Aggravated: Pre-existing skin disorders may be aggravated by over-exposure to this product.

SECTION 3 - COMPOSITION

<u>Chemical Name</u>	<u>CAS#</u>	<u>% By Weight</u>	<u>Classification according to Regulation (EC) No 1272/2008 [CLP]</u>
Catalyst (1)	Trade Secret	50 - 80	Not classified.
Triethylenetetramine	112-24-3	10 - 30	Acute Tox. (O), Cat. 4; Acute Tox. (D), Cat. 4; Skin Irr., Cat. 1; Skin Sens., Cat. 1; Aquatic Chronic, Cat. 1; H302 + H312; H314; H317; H412
3-(2-Aminoethylamino) propyltrimethoxysilane	1760-24-3	1 - 15	Flam. Liq., Cat. 4; Ser. Eye Dmg., Cat. 1; Skin Irr., Cat. 2; Skin Sens., Cat. 1; H227; H315; H317; H318

SECTION 4 - FIRST AID MEASURES

Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin, and eye contact, and ingestion.



Eyes:

In case of eye contact immediately flush abundantly with water; have eye bath available if possible. Do not rub eyes. Get medical attention, if irritation persists.

Skin:

Immediately remove contaminated clothing, and any extraneous chemical, if possible do so without delay. Initiate and maintain gentle and continuous irrigation until the patient receives medical care.

Ingestion:

Get immediate medical attention. Do not induce vomiting unless instructed to do so by a poison center or physician.

Inhalation:

Move exposed person to fresh air. Keep person warm and at rest. If breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention if adverse health effects persist or are severe.

Signs and symptoms of overexposure.

Eyes: Symptoms include redness, burning, and swelling of skin, burns, and other skin damage.

Skin: Symptoms may include redness, burning, and swelling of skin, burns, and other skin damage.

Skin Absorption: Not available.

Ingestion: May include severe mouth, throat and abdominal pain; nausea; vomiting; and diarrhea; blood in the feces and/or vomitus may also be seen.

Inhalation: Symptoms may include severe irritation and burns to the nose, throat, and respiratory tract. Symptoms are not expected at air concentrations below the recommended exposure limits, if applicable.

Acute effects: Not available.



Chronic effects: Not available.

Notes to Physicians:

Treatment is symptomatic and supportive.

SECTION 5 - FIRE FIGHTING MEASURES

Extinguishing media.

Use foam, water spray, Carbon dioxide (CO₂), or Dry chemical when fighting fires involving this materials.

Hazardous combustion products.

Nitrogen oxides and other potentially hazardous nitrogen-containing compounds.

Explosion hazards.

Not available.

Fire fighting procedures.

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire.

Fire fighting equipment.

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Fire explosion.

Not available.

Sensitive to static discharge.

Not available.

Sensitivity to Impact.

Not available.

Hazardous decomposition products.

Not available.



SECTION 6 - ACCIDENTAL RELEASE MEASURES

Small Spill.

Avoid run off into storm sewers and ditches which lead to waterways.

Environmental precautions.

Water spill: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers. Inform relevant authorities if the product has caused environmental pollution (sewers, waterways, soil, or air).

General procedures.

Absorb with inert absorbent materials such as: Dry sand, Vermiculite, and/or Activated charcoal. Place in appropriate chemical waste container.

SECTION 7 - HANDLING AND STORAGE

Handling.

Put on appropriate personal protective equipment. Eating, drinking, and smoking should be prohibited where this material handled, stored and processed. Workers should wash hands and face before eating, drinking, and smoking. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Empty containers retain product residue and can be hazardous. Do not reuse container. Refer to Section 8 for additional information.

Storage.

Do not store near acids. Keep away from Oxidizers. Keep containers tightly closed in dry, cool and well-ventilated place. Keep away from heat and sources of ignition.

Storage temperature.

Store in accordance with local regulations. Store in original container in a dry, cool and well-ventilated area. Do not store in unlabeled containers.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available.



OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)

Chemical Name	EXPOSURE LIMITS			
	Type		ppm	mg/m ³
Catalyst (1)	OSHA PEL	TWA	Not established	Not established
	ACGIH TLV	TWA	Not established	Not established
Triethylenetetramine	OSHA PEL	TWA	Not available	Not available
	ACGIH TLV	TWA	Not available	Not available
	Supplier OEL	TWA	1 ^[1]	Not available ^[1]
3-(2-Aminoethylamino) propyltrimethoxysilane	OSHA PEL	TWA	Not established	Not established
	ACGIH TLV	TWA	Not established	Not established
	Supplier OEL	TWA	Not established	Not established

Footnotes:

1. Workplace Environmental Exposure Level (WEEL), 8hr

Engineering controls.

Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapors or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep workers exposure to airborne contaminants below any recommended or statutory limits.

Individual protection measures, such as personal protective equipment.

Eyes and face:

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, gases or dusts. As necessary, wear goggles or safety glasses with side shields.

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.

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.

**Protective Clothing:**

Long sleeves, long trousers to protect skin from contact.

Work hygienic practices:

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. Ensure that eyewash stations and safety showers are close to the workstation.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid	Vapor density:	> 1 (AIR=1)
Appearance:	Colorless to slight yellow	Boiling point:	> 170°C (338°F)
Odor:	Amine odor	Freezing point:	Not available
Odor threshold:	Not available	Thermal decomposition:	Not available
pH:	Not available	Solubility in water:	Negligible
Percent volatile:	Not available	Evaporation rate:	Not available
Vapor pressure:	< 0.001 kPa at 20°C (68°F)	Specific gravity:	1 to 1.1
Flammable limits:	Not available	Viscosity:	Not available
Autoignition temperature:	> 300°C (572°F)	Oxidizing properties:	Not available
Flash point and method:	> 100°C (212°F) Pensky-Martens Closed Cup Notes: Lowest Flashing component	Partition coefficient (n-octanol/water):	Not available

SECTION 10 - STABILITY AND REACTIVITY

Reactivity:	Stable under normal conditions.
Hazardous polymerization:	Product will not undergo hazardous polymerization.
Stability:	This product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid:	Keep away from heat, flame and sparks.
Possibility of hazardous reactions:	Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous decomposition products:	Nitrogen oxides, carbon monoxide and unidentified organic compounds may be formed during combustion.
Incompatible materials:	Reactive or incompatible with the following materials: oxidizing materials, strong acids, and strong alkalis.



SECTION 11 - TOXICOLOGICAL INFORMATION

<u>Chemical Name</u>	<u>Oral LD₅₀ (rat)</u>	<u>Dermal LD₅₀ (rabbit)</u>	<u>Inhalation LC₅₀ (rat)</u>
Catalyst (1)	Not data available	No data available	No data available
Triethylenetetramine	~ 1080 mg/kg Rat	~ 675 mg/kg Rabbit	No data available
3-(2-Aminoethylamino)propyltrimethoxysilane	7669 mg/kg Rat	No data available	No data available

Skin corrosion / irritation:

Skin - Rabbit. Result: Corrosive - 4 h.

Serious eye damage / irritation:

In an OECD No. 404 study conducted on the rabbit with a 4 hr occlusive exposure scores for erythema and oedema were minimal. Therefore, this material is not a skin irritant. In other studies conducted with the rabbit a 4 hr occlusive exposure was used. Maximum erthema and oedema scores observed under these extreme conditions were 1.5-2 and 1-1.5 respectively.

Respiratory or skin sensitization:

Has caused allergic skin reactions in humans. Did not cause allergic skin reactions when tested in mice.

Germ cell mutagenicity:

Not available.

Carcinogenicity:

<u>Chemical Name</u>	<u>NTP Status</u>	<u>IARC Status</u>	<u>OSHA Status</u>
Catalyst (1)	Not listed	Not classified	Not regulated
Triethylenetetramine	Not listed	Not classified	Not regulated
3-(2-Aminoethylamino)propyltrimethoxysilane	Not listed	Not classified	Not regulated

Reproductive toxicity:

Contains a chemical or chemicals which can cause birth defects or other reproductive harm.

STOT-Single exposure:

Triethylenetetramine: Category 1: Target Organ = Eyes



STOT-Repeated exposure:

Triethylenetetramine; Category 1; Target Organs = Skin, Liver, Kidneys

Aspiration Hazard:

Not available.

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Data: Not available.

Ecotoxicological Information: Not available.

Distribution: Not available.

Aquatic Toxicity (Acute):

96-Hour LC₅₀: Not available.

48-Hour EC₅₀: ~ 33.9 [mg/L]; 48 hr; Daphnia magna (Water Flea); Static Test; OECD 202

96-Hour EC₅₀: ~ 3.7 [mg/l]; Sclerodermis capricornutum (Algae) - 96 hour.

Notes: Based on component(s).

Chemical Fate Information: Not available.

General Comments: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal Method:

The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. 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. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Product Disposal:

Any disposal practice must be in compliance with all local and national laws and regulations. Do not dump into any sewers, on the ground, or into any body of water.

Empty Container:

Empty containers or lines may retain some product residues. This material and its container must be disposed of in a safe way.



SECTION 14 - TRANSPORT INFORMATION

DOT (Department of Transportation)

Proper Shipping Name:	Amines, Liquid, Corrosive, N.O.S.
Technical Name:	Triethylenetetramine mixture.
Primary Hazard Class / Division:	8
UN / NA Number:	2735
Packing Group:	II

Air (ICAO / IATA)

Shipping Name:	Amines, Liquid, Corrosive, N.O.S.
Technical Name:	Triethylenetetramine mixture.
UN / NA Number:	2735
Primary Hazard Class / Division:	8
Packing Group:	II

Vessel (IMO / IMDG):

Shipping Name:	Amines, Liquid, Corrosive, N.O.S.
Technical Name:	Triethylenetetramine mixture.
UN / NA Number:	2735
Primary Hazard Class / Division:	8
Packing Group:	II

Comments:

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

SECTION 15 - REGULATORY INFORMATION

United States Regulations:

DOT Label Symbol and Hazard Classification



Corrosive

SARA Title III (Superfund Amendments and Reauthorization Act):

Fire:	No
Pressure Generating:	No
Reactivity:	No
Acute:	Yes
Chronic:	Yes

313 Reportable Ingredients: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title II, Section 313.



CERCLA (Comprehensive Response, Compensation, and Liability Act):

CERCLA Regulatory: Not available

EPA:

EPA RQ Ingredient: Not available.

TSCA (Toxic Substance Control Act):

TSCA Status: All ingredients in this material are on the TSCA Inventory.

California Proposition 65:

This product contains a chemical known in the State of California to cause cancer.

Canadian Regulations:

WHMIS Hazard Symbol and Classification:



Corrosive Toxic

WHMIS (Workplace Hazardous Materials Information System):

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by the Controlled Products Regulations.

WHMIS Class:

Class D-2B: Material causing other toxic effects (Toxic).

Domestic Substance List (Inventory):

The ingredients of this product are listed on the Domestic Substance List, Non-Domestic Substance List or are exempt.

SECTION 16 - OTHER INFORMATION

Effective Date: July 28, 2016

Revision Date: 1/6/2020

Revision Summary: Company Information updated.

SDS Prepared By: CeraMaterials

Manufacturer Supplemental Notes: Information Phone Number: (518) 399-5338

Additional SDS Information: Safety Data Sheet prepared in accordance with UNECE Globally Harmonized System of Classification and Labeling of Chemicals (GHS) Fourth revision edition.

Disclaimer: The information provided herein was believed by Astro Chemical Company, Inc and CeraMaterials to be accurate at the time of preparation or prepared from sources believe to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of this product and to determine the suitability of the product for its intended use.