

P.O. Box 4980  
The Woodlands, TX 77387-4980

8 am to 5 pm Phone: (800) 257-5547  
24-Hour Emergency Phone: (800) 328-8501  
International Emergency Phone: (409) 727-0831  
Asia Pacific Emergency Phone: (65) 6336-6011

**Effective Date:** 5/19/10

**Material Safety Data Sheet**

MSDS No: 2247

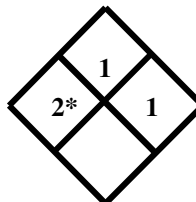
**1. PRODUCT IDENTIFICATION**

**Trade Name:** EPIBOND 104A

**Material Code:** FPC2062

**Chemical Family:** Filled Epoxy Resin

**Intended Use:** Adhesive



NFPA RATING

**2. COMPOSITION / INFORMATION ON INGREDIENTS**

**OSHA Hazardous Ingredients:** Eye and skin irritation.

O S H A	CAS No.	CHEMICAL IDENTITY	EXPOSURE LIMITS				CARCINOGEN STATUS			
			ACGIH		OSHA		MFR.	IARC	NTP	OSHA
			TWA	STEL	PEL	STEL				
	14808-60-7	Quartz (SiO2)  Common Name: Crystalline Silica (Quartz) Concentration: 0.30 - 0.70 % by wt	0.05 mg/m3	NE	NE	NE	NE	Yes	Yes	Yes
	25068-38-6	Phenol, 4,4'-(1-methylethylidene)bis-, polymer with (chloromethyl)oxirane Bisphenol A epoxy resin  Common Name: Bisphenol A epoxy resin Concentration: 60.00 - 90.00 % by wt	NE	NE	NE	NE	NE	NR	NR	NR
	68953-58-2	Quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, salts with bentonite Dimethyl dihydrogenated tallow ammonium chloride reaction product with bentonite  Common Name: Dimethyl dihydrogenated tallow ammonium chloride reaction product with bentonite Concentration: 10.00 - 30.00 % by wt	NE	NE	NE	NE	NE	NR	NR	NR
*	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester Dibutyl Phthalate  Common Name: Dibutyl Phthalate Concentration: 10.00 - 30.00 % by wt	5 mg/m3	NE	5 mg/m3	NE	NE	NR	NR	NR

Effective Date: 5/19/10

NE = Not Established NR = Not Reviewed \* = OSHA Hazardous Ingredient

### **3. HAZARDS IDENTIFICATION**

**Emergency Overview:** CAUTION! May cause eye irritation. Prolonged or repeated skin contact may cause irritation, and may cause allergic skin reaction. Harmful if inhaled. Harmful if swallowed.

**Primary Route(s) of Entry:** Dermal, inhalation.

**Potential Health Effects:** Vapor or mist may possibly be harmful if inhaled. Substance may cause moderate irritation to eyes. Substance may cause slight irritation to skin. Substance may possibly be harmful if ingested.

**Carcinogenicity (NTP, IARC, OSHA):** This product contains Crystalline Silica, considered to be carcinogenic by NTP, IARC and/ or OSHA.

**Chronic:** Overexposure to Dibutyl Phthalate (DBP) has been suggested as a cause of the following effects in laboratory animals: mild, reversible liver effects, mild reversible changes in blood cell counts, kidney abnormalities, female reproductive effects, testis damage. DBP has been shown to cause birth defects in laboratory animal studies. The relevance of these findings to humans is uncertain.

### **4. FIRST AID MEASURES**

**Ingestion:** Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Seek immediate medical attention.

**Skin:** Immediately wash with soap and water. Remove contaminated clothing and laundry before reuse. Destroy contaminated shoes. Seek immediate medical attention.

**Inhalation:** Remove to fresh air. Seek immediate medical attention.

**Eyes:** Immediately flush eyes with water for at least 15 minutes. Seek immediate medical attention.

**Note to Physician:** Allergic dermatitis or respiratory response in susceptible individuals may be delayed. It may appear after weeks or even months of frequent and prolonged contact.

**Medical Conditions Aggravated by Exposure:** Allergy, skin or eye conditions.

### **5. FIRE FIGHTING MEASURES**

**Flash Point:** 190°C (374 °F)

**Flash Point Method Used:** Open Cup

**Fire Fighting Extinguishing Media:** Carbon dioxide, foam, dry chemical, water spray.

**Fire Fighting Equipment:** Use self-contained breathing apparatus and full protective clothing.

---

**Effective Date: 5/19/10**

---

**Fire and Explosion Hazards:** Keep fire-exposed containers cool with water. Do NOT use a solid stream of water. A solid stream of water can spread fire.

**Hazardous Combustion Products:** Decomposition and combustion products may be toxic.

## **6. ACCIDENTAL RELEASE MEASURES**

**Accidental Release Measures:** Clean-up all traces of spill. As much as possible shovel material into clean, dry containers. On hard surfaces use absorbent material to pick-up remainder and on loose surfaces shovel-up contaminated layer.

## **7. HANDLING AND STORAGE**

**Signal Word:** CAUTION!

**Precautions:** Avoid contact with eyes, skin, or clothing. Wear eye protection and impervious gloves when handling. Wash thoroughly after handling. Avoid breathing vapor or mist. Keep containers closed when not in use. Use only with adequate ventilation. Do not take internally.

**Other Handling Information:** In accordance with good industrial practice, handle with care and avoid unnecessary personal contact. Avoid contact with eyes and prolonged or repeated skin contact. Do not inhale mists. Use with adequate ventilation. For industrial use only.

**Storage Information:** MAXIMUM 35° C - Store indoors in a cool, dry area with adequate ventilation.

**Additional Information:** PLEASE READ TECHNICAL DATA SHEET BEFORE HANDLING THE PRODUCT. KEEP OUT OF THE REACH OF CHILDREN. FOR INDUSTRIAL USE ONLY.

## **8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Personal Protective Equipment:** Eye bath and safety shower should be available. Wear protective clothing.

**Exposure Guidelines:** Wash thoroughly after handling and before eating, drinking, or using tobacco products.

**Skin Protection:** Wear impervious gloves.

**Respiratory Protection:** Wear respirator (MSHA/NIOSH or approved equivalent) suitable for concentrations and type of air contaminants encountered.

**Eye Protection:** Wear safety glasses or goggles.

**Engineering Controls:** Good general mechanical ventilation and local exhaust if needed.

**Emergency Response Protection:** Wear breathing apparatus (MSHA/NIOSH-approved, pressure demand, self-contained or equivalent) and full protective gear.

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b>	Non-flow Paste
<b>Color:</b>	Cream
<b>Odor:</b>	No Odor

Effective Date: 5/19/10

<b>Solubility in Water:</b>	Negligible
<b>Viscosity:</b>	Soft paste
<b>Vapor Pressure:</b>	< 1 mm Hg at 20°C (68 °F)
<b>Specific Gravity:</b>	1.15 (Water =1)
<b>Evaporation Rate:</b>	< 1 (Butyl Acetate = 1)
<b>Vapor Density:</b>	> 1 (Air = 1)
<b>VOC:</b>	12 g/L (This is an estimated value.)
<b>Coefficient of water/oil:</b>	Not Evaluated

## **10. STABILITY AND REACTIVITY**

**Conditions to Avoid:** Elevated temperatures

**Stability:** Stable under normal conditions.

**Incompatibility:** Strong oxidizing agents

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide, various hydrocarbons

**Hazardous Polymerization:** Will not occur.

## **11. TOXICOLOGICAL INFORMATION**

**Acute Oral Effects (LD50):** For Bisphenol A Diglycidyl Ether Resin: >4,000 mg/Kg (rats)

**Acute Dermal Toxicity (LD50):** For Bisphenol A Diglycidyl Ether Resin: >5,000 mg/Kg (rabbits)

**Inhalation Toxicity (LC50):** Not available

**Sensitization:** Skin sensitizer.

**Carcinogenicity:** Crystalline silica dust in its neat form is on the IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans (Volume 42, 1987) concludes that there is sufficient evidence for the carcinogenicity of crystalline silica to experimental animals, and there is limited evidence of the carcinogenicity of crystalline silica to Humans. IARC Class 2A

**Skin Irritation:** Slight irritation.

**Eye Irritation:** Moderate irritant.

**Reproduction:** 1,2-Benzenedicarboxylic acid, dibutyl ester: may cause birth defects and reproductive disorders.

## **12. ECOLOGICAL INFORMATION**

**Biodegradability:** No information available.

**Ecotoxicity:** No information available.

## **13. DISPOSAL CONSIDERATIONS**

Effective Date: 5/19/10

**Waste Disposal Method:** Incinerate in approved site or facility in accordance with local, state and federal regulations. Avoid personal contact during transfer and handling.

#### **14. TRANSPORT INFORMATION**

##### **DOT: Non-Bulk**

**Proper Shipping Name:** Environmentally hazardous substance, liquid, n.o.s.  
**Technical Shipping Name (If n.o.s.):** bisphenol A epoxy resin, dibutyl phthalate  
**Hazard Class:** 9  
**ID Number:** UN 3082  
**Packing Group:** PG III  
**Marine Pollutant:** Marine Pollutant

##### **IATA: Non-Bulk**

**Proper Shipping Name:** Environmentally hazardous substance, liquid, n.o.s.  
**Technical Shipping Name (If n.o.s.):** bisphenol A epoxy resin, dibutyl phthalate  
**Hazard Class:** 9  
**ID Number:** UN 3082  
**Packing Group:** PG III  
**Marine Pollutant:** Marine Pollutant

##### **IMDG:**

**Proper Shipping Name:** Environmentally hazardous substance, liquid, n.o.s.  
**Technical Shipping Name (If n.o.s.):** bisphenol A epoxy resin, dibutyl phthalate  
**Hazard Class:** 9  
**ID Number:** UN 3082  
**Packing Group:** PG III  
**Marine Pollutant:** Marine Pollutant

##### **TDG: Non-Bulk**

**Proper Shipping Name:** Environmentally hazardous substance, liquid, n.o.s.  
**Technical Shipping Name (If n.o.s.):** bisphenol A epoxy resin, dibutyl phthalate  
**Hazard Class:** 9  
**ID Number:** UN 3082  
**Packing Group:** PG III  
**Marine Pollutant:** Marine Pollutant

#### **15. REGULATORY INFORMATION**

##### **US Federal Regulations:**

**Clean Air Act -Hazardous Air Pollutants (HAP):** The following chemical(s) are listed as hazardous air pollutants (HAP) under the U.S. Clean Air Act Section 12 (40 CFR 61):

1,2-Benzenedicarboxylic acid, dibutyl ester  
 Dibutyl Phthalate  
 84-74-2  
 12.5 % by wt

**Occupational Safety and Health Act (OSHA):** This Material Safety Data Sheet (MSDS) has been prepared in compliance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200. This product is considered to be a hazardous chemical under that standard.

Effective Date: 5/19/10

**Resource Conservation and Recovery Act (RCRA):** This product is considered to be a hazardous waste under RCRA (40 CFR 261).  
U069

**SARA Title III: Section 304 - CERCLA:** This product contains the following chemicals regulated under Section 304 (40 CFR 302) as hazardous substance(s) for emergency release notification ("CERCLA" List):

Chemical Name: 1,2-Benzenedicarboxylic acid, dibutyl ester

Common Name: Dibutyl Phthalate

CAS Number: 84-74-2

Percent in Composition: 10 - 60 % by wt

Component RQ: 10

**SARA Title III: Section 311/312 - Hazard Communication Standard (HCS):** Immediate (acute) health hazard.  
Delayed (chronic) health hazard.

**SARA Title III: Section 313 Toxic Chemical List (TCL):** This product contains a toxic chemical(s) for routine annual toxic chemical release reporting under section 313 (40 CFR 372). This information must be included in all MSDS's copied or distributed for this material.

Chemical Name: 1,2-Benzenedicarboxylic acid, dibutyl ester

Common Name: Dibutyl Phthalate

Percent in Composition: 10 - 30 % by wt

Comment: CERTAIN GLYCOL ETHERS

**TSCA Section 8(b) - Inventory Status:** Chemical components listed on TSCA Inventory.

**TSCA Section 12(b) - Export Notification:** This product does not contain any chemical(s) that are subject to a Section 12(b) export notification.

### **International Regulations:**

**Australian Inventory Status:** This product contains only chemicals which are currently listed on the Australian Inventory of Chemical Substances.

**Canadian Inventory Status:** All components included on the Domestic Substances List (DSL).

**Canadian WHMIS:** This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations. D2A, D2B

**European Inventory Status (EINECS):** This product contains only chemicals that are currently listed on the European Inventory of Existing Commercial Chemical Substances (EINECS).

**Japanese Inventory Status:** This product contains only chemicals currently listed on the Japanese Ministry of International Trade and Industry List of Existing and New Chemical Substances.

### **State Regulations:**

**California Proposition 65:** The following is required composition information. This product contains the following chemical(s) which are currently listed on the California list of Known Carcinogens and Reproductive Toxins:

Chemical Name: 1,2-Benzenedicarboxylic acid, dibutyl ester

Common Name: Dibutyl Phthalate

**Effective Date: 5/19/10**

CAS Number: 84-74-2

Percent in Composition: 10 - 30 % by wt

Comment: Warning! This chemical is known to the State of California to cause birth defects or other reproductive harm.

Chemical Name: Quartz (SiO<sub>2</sub>)

Common Name: Crystalline Silica (Quartz)

CAS Number: 14808-60-7

Percent in Composition: 0.3 - 0.7 % by wt

Comment: Warning! This chemical is known to the State of California to cause cancer.

**Pennsylvania Right-to-Know:** The following is required composition information:

Chemical Name: Phenol, 4,4'-(1-methylethylidene)bis-, polymer with (chloromethyl)oxirane

Common Name: Bisphenol A epoxy resin

CAS Number: 25068-38-6

Comment: Not on Pennsylvania Hazardous Substance List

Chemical Name: Quaternary ammonium compounds, bis(hydrogenated tallow alkyl)dimethyl, salts with bentonite

Common Name: Dimethyl dihydrogenated tallow ammonium chloride reaction product with bentonite

CAS Number: 68953-58-2

Comment: Not on Pennsylvania Hazardous Substance List

Chemical Name: 1,2-Benzenedicarboxylic acid, dibutyl ester

Common Name: Dibutyl Phthalate

CAS Number: 84-74-2

Comment: Environmental Hazardous Substance

**16. OTHER INFORMATION**

<b>MSDS No:</b>	2247
<b>Reason Issued:</b>	5/10 DOT -10/08 update Haz- 10/07 add WHMIS - update 2/28/07 - new format
<b>Prepared By:</b>	Matthew Austin
<b>Approved By:</b>	Matthew Austin
<b>Title:</b>	EH&S Chemist
<b>Supersedes Date:</b>	10/13/08

**Other Information:** L/M Codes: DF/Si/KLCBT/CA3- (D12121233) [DD9]  
Material Code: FPC2062

**Disclaimer:** The information and recommendations contained herein are based upon tests in controlled laboratory conditions, are believed to be correct, and are provided for the sole purpose of hazard communication as part of Huntsman's product safety program. This product has not been tested for, and therefore is not recommended or suitable for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended or likely, or for uses for which implantation within the human body is intended, and Huntsman assumes no liability for any such uses.

The information and recommendations contained herein are not intended to constitute performance information concerning the product, which is available in separate technical data sheets available from Huntsman upon request. Users are urged, and are urged to urge others who may come in contact with the product, to obtain and consult data sheets prior to purchase, use, transportation or storage of the product.

HUNTSMAN MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY, QUALITY, OR FITNESS FOR A PARTICULAR PURPOSE. HUNTSMAN'S LIABILITY IS

---

**Effective Date: 5/19/10**

---

STRICTLY LIMITED TO REIMBURSEMENT OF BUYER'S PURCHASE PRICE, OR IN HUNTSMAN'S DISCRETION REPLACEMENT, OF THE PRODUCT IN RESPECT OF WHICH SUCH CLAIM IS MADE. HUNTSMAN'S LIABILITY IS STRICTLY LIMITED BY LEGAL NOTICES IN TECHNICAL DATA SHEETS, PRODUCT LITERATURE, AND/OR SALE DOCUMENTS. The foregoing DISCLAIMERS and LIMITATION OF LIABILITY supercede inconsistent or contradictory provisions in Buyer's documents.

USER SHOULD CONSULT A LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENTAL AGENCY TO DETERMINE THE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT. HUNTSMAN DOES NOT UNDERTAKE TO FURNISH ADVICE ON SUCH MATTERS.

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS.



# Material Safety Data Sheet

## EPIBOND 104B

### 1. Product and company identification

**Product name** : EPIBOND 104B  
**Material uses** : Adhesive.  
**MSDS #** : 00066666  
**Validation date** : 4/29/2011.  
**Print date** : 4/29/2011.

**Supplier/Manufacturer** : Huntsman Advanced Materials Americas LLC  
P.O. Box 4980  
The Woodlands, TX 77387

Non-Emergency phone: (800) 257-5547

E-Mail: MSDS@huntsman.com

**In case of emergency** : Chemtrec: (800) 424-9300 or (703) 527-3887

### 2. Hazards identification

**Physical state** : Liquid.  
**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Emergency overview** : DANGER!  
CAUSES EYE AND SKIN BURNS. HARMFUL IF ABSORBED THROUGH SKIN. CAUSES RESPIRATORY TRACT IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF SWALLOWED. CAN CAUSE TARGET ORGAN DAMAGE. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA.

Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

See toxicological information (Section 11)

**GENERAL INFORMATION** : Read the entire MSDS for a more thorough evaluation of the hazards.

### 3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
triethylenetetramine	112-24-3	60 - 100
2-(2-aminoethylamino)ethanol	111-41-1	1 - 3
2-piperazin-1-ylethylamine	140-31-8	1 - 3
tetraethylenepentamine	112-57-2	1 - 3

## 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.
- Notes to physician** : Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

## 5 . Fire-fighting measures

- Flash point** : Closed cup: 148°C (298.4°F)
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide  
nitrogen oxides
- 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.
- 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** : 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. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. 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

**Consult local authorities for acceptable exposure limits.**

- 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.
- Engineering measures** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- 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. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Personal protection**
- Respiratory** : In case of inadequate ventilation wear respiratory protection. 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.
- 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.
- 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

### General information

#### Appearance

- Physical state** : Liquid.  
**Color** : Not available.  
**Odor** : Not available.

### Important health, safety and environmental information

- pH** : Not available.  
**Boiling/condensation point** : 277°C (530.6°F)  
**Melting/freezing point** : -35°C (-31°F)  
**Flash point** : Closed cup: 148°C (298.4°F)  
**Flammable limits** : Not available.  
**Auto-ignition temperature** : Not available.  
  
**Vapor pressure** : <0.013 kPa (<0.1 mm Hg) [20°C]  
**Specific gravity** : 0.98  
**Partition coefficient: n-octanol/water (log Kow)** : Not available.  
**Density** : Not available.  
**Vapor density** : Not available.  
**Evaporation rate (butyl acetate = 1)** : <0.1 (butyl acetate = 1)  
**VOC** : Not available.

## 10 . Stability and reactivity

- Chemical stability** : The product is stable.  
**Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.  
**Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.  
**Conditions to avoid** : No specific data.  
**Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## 11 . Toxicological information

### Potential acute health effects

- Inhalation** : Irritating to respiratory system.  
**Ingestion** : Harmful if swallowed. May cause burns to mouth, throat and stomach.  
**Skin** : Corrosive to the skin. Causes burns. Toxic in contact with skin. May cause sensitization by skin contact.  
**Eyes** : Corrosive to eyes. Causes burns.

### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
-------------------------	--------	---------	------	----------

## 11 . Toxicological information

triethylenetetramine	LD50 Dermal	Rabbit - Male, Female	1465 mg/kg	-
	LD50 Oral	Rat - Male, Female	1716 mg/kg	-
2-(2-aminoethylamino)ethanol	LD50 Dermal	Rat - Male, Female	>2000 mg/kg	-
	LD50 Oral	Rat - Male, Female	2150 mg/kg	-
	LC0 Inhalation Vapor	Rat	51.3 mg/m3	8 hours
2-piperazin-1-ylethylamine	LD50 Dermal	Rabbit	880 mg/kg	-
	LD50 Oral	Rat	2140 mg/L	-

### Chronic toxicity

Product/ingredient name	Result	Species	Dose	Exposure
triethylenetetramine	Sub-chronic NOAEL Oral	Rat - Male, Female	50 mg/kg/d	26 weeks
2-(2-aminoethylamino)ethanol	Sub-acute NOAEL Dermal	Rat - Male, Female	>1000 mg/kg/d	28 days; 5 days per week
	Sub-acute NOAEL Oral	Rat - Male, Female	60 mg/kg/d	28 days; 5 days per week
2-piperazin-1-ylethylamine	Sub-acute NOEL : Dermal	Rat - Male, Female	>1000 mg/kg/d	28 days; 5 days per week
	Sub-chronic NOEL : Dermal	Rat - Male, Female	1000 mg/kg	29 days; 5 days per week

### Sensitizer

Product/ingredient name	Route of exposure	Species	Result
triethylenetetramine	skin	Guinea pig	Sensitizing
2-(2-aminoethylamino)ethanol	skin	Guinea pig	Sensitizing
	skin	Mouse	Sensitizing
2-piperazin-1-ylethylamine	skin	Guinea pig	Sensitizing

### Mutagenicity

Product/ingredient name	Test	Experiment	Result
triethylenetetramine	-	Experiment: In vitro Subject: Bacteria Metabolic activation: +/-	Positive
	-	Experiment: In vivo Subject: Mammalian- Animal Cell: Somatic	Negative
2-(2-aminoethylamino)ethanol	OECD 471 Bacterial Reverse Mutation Test	Experiment: In vitro Subject: Bacteria Metabolic activation: +/-	Negative
	OECD 476 <i>In vitro</i> Mammalian Cell Gene Mutation Test	Experiment: In vitro Subject: Mammalian- Animal Metabolic activation: +/-	Negative
	OECD 477 Genetic Toxicology: Sex-Linked Recessive Lethal Test in <i>Drosophila Melanogaster</i>	Experiment: In vivo Subject: Insect	Negative
	OECD 474 Mammalian Erythrocyte Micronucleus Test	Experiment: In vivo Subject: Mammalian- Animal	Negative
2-piperazin-1-ylethylamine	-	Experiment: In vitro	Negative

## 11 . Toxicological information

Subject: Mammalian-Animal  
 Cell: Somatic  
 Metabolic activation: +/-  
 Experiment: In vitro Negative  
 Subject: Mammalian-Animal  
 Cell: Somatic  
 Experiment: In vitro Negative  
 Subject: Mammalian-Animal  
 Experiment: In vitro Negative  
 Subject: bacteria/yeast  
 Metabolic activation: +/-  
 Experiment: In vivo Negative  
 Subject: Mammalian-Animal

### Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
2-(2-aminoethylamino)ethanol	-	-	-	Rat - Male, Female	Oral: >1000 mg/kg	-
	-	-	-	Rat - Male, Female	Oral: >50 mg/kg NOAEL	-
	-	-	-	Rat - Male, Female	Oral: >50 mg/kg NOAEL	-
2-piperazin-1-ylethylamine	Negative	Negative	Negative	Rat	Oral	28 days

### Potential chronic health effects

- Chronic effects** : Can cause target organ damage. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
- Target organs** : Causes damage to the following organs: liver.  
 Contains material which may cause damage to the following organs: kidneys, lungs, heart.
- Carcinogenicity** : No known significant effects or critical hazards.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : Contains material which may cause birth defects, based on animal data.
- Fertility effects** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.

### Medical conditions aggravated by over-exposure

Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

## 12 . Ecological information

**Environmental effects** : Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

### Aquatic ecotoxicity

<u>Product/ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Species</u>	<u>Exposure</u>
2-piperazin-1-ylethylamine	-	Acute EC50 >1000 mg/L	Algae	72 hours
	-	Acute EC50 >100 mg/L	Fish	96 hours
	-	Acute EC50 32 mg/L	Daphnia	48 hours
	-	Chronic EC20 1600 mg/L	Bacteria	1 hours Static
	-	Chronic NOEC 31 mg/L	Algae	72 hours

### Biodegradability

<u>Product/ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Dose</u>	<u>Inoculum</u>
2-piperazin-1-ylethylamine	-	<60 % - Not readily - 28 days	-	-

### Other ecological information

Not Determined  
Not Determined

<u>Product/ingredient name</u>	<u>Aquatic half-life</u>	<u>Photolysis</u>	<u>Biodegradability</u>
2-piperazin-1-ylethylamine	-	-	Not readily
<u>Product/ingredient name</u>	<u>LogP<sub>ow</sub></u>	<u>BCF</u>	<u>Potential</u>
2-piperazin-1-ylethylamine	-1.48	-	low

**Other adverse effects** : No known significant effects or critical hazards.

**PBT** : Not applicable.

### Other information

## 13 . Disposal considerations

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. 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. 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.**

## 14 . Transport information





### Proper shipping name

DOT : TRIETHYLENETETRAMINE

TDG : TRIETHYLENETETRAMINE

IMDG : TRIETHYLENETETRAMINE

IATA : TRIETHYLENETETRAMINE

Regulatory information	UN number	Classes	PG*	Label	Additional information
DOT Classification	UN2259	8	II		-
TDG Classification	UN2259	8	II		-
IMDG Class	UN2259	8	II		-
IATA-DGR Class	UN2259	8	II		-

PG\* : Packing group

## 15 . Regulatory information

### U.S. Federal regulations

#### HCS Classification

: Toxic material  
Corrosive material  
Sensitizing material  
Target organ effects

#### TSCA 8(b) inventory

: **United States inventory (TSCA 8b):** All components are listed or exempted.

#### TSCA 5(a)2 final significant new use rule (SNUR)

: None.

#### TSCA 5(e) substance consent order

: None.

#### TSCA 12(b) one-time export

: None.

#### TSCA 12(b) annual export notification

: None.

#### SARA 302/304/311/312 extremely hazardous substances

: **SARA 302/304/311/312 extremely hazardous substances:** No Ingredient Listed

#### SARA 311/312 hazard identification

: **SARA 311/312 MSDS distribution - chemical inventory - hazard identification:**  
triethylenetetramine: Immediate (acute) health hazard, Delayed (chronic) health hazard



## 15 . Regulatory information

- Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)** : **Product name** : No Ingredients Listed. **CAS number** : **Concentration**
- Clean Air Act - Ozone Depleting Substances (ODS)** : This product does not contain nor is it manufactured with ozone depleting substances.
- SARA 313** : No ingredients listed.

**CERCLA: Hazardous substances:** No ingredients listed.

### STATE REGULATIONS:

**PENNSYLVANIA - RTK:** The following components are listed: 1,2-ETHANEDIAMINE, N,N'-BIS(2-AMINOETHYL)-

**California Prop 65 :** This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

### Canada

**WHMIS (Canada)** : Class D-2A: Material causing other toxic effects (Very toxic).  
Class D-2B: Material causing other toxic effects (Toxic).  
Class E: Corrosive material

**CEPA DSL** : All components are listed or exempted.

**International lists** : **Australia inventory (AICS):** All components are listed or exempted.  
**China inventory (IECSC):** All components are listed or exempted.  
**Japan inventory:** All components are listed or exempted.  
**Korea inventory:** All components are listed or exempted.  
**New Zealand Inventory of Chemicals (NZIoC):** Not determined.  
**Philippines inventory (PICCS):** All components are listed or exempted.

## 16 . Other information

**Label requirements** : CAUSES EYE AND SKIN BURNS. HARMFUL IF ABSORBED THROUGH SKIN. CAUSES RESPIRATORY TRACT IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF SWALLOWED. CAN CAUSE TARGET ORGAN DAMAGE. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA.

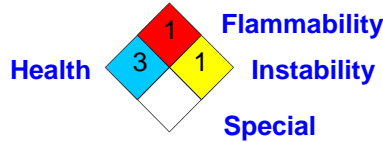
**Hazardous Material Information System (U.S.A.)** :

Health	3
Flammability	1
Physical hazards	1
Personal protection	

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

## 16 . Other information

National Fire Protection Association (U.S.A.) :



Date of printing : 4/29/2011.

Date of issue : 4/29/2011.

Date of previous issue : 4/29/2011.

Version : 2

✔ Indicates information that has changed from previously issued version.

### Notice to reader

*While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.*

**IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.**

**THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.**

*Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.*

**NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS.**