

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
 	<p>THIS MATERIAL IS TOXIC BY INHALATION. Highly toxic compound; do not ingest or inhale. Combustible material; avoid heat and sources of ignition. Irritating to skin, eyes, and the respiratory system. POSSIBLE CARCINOGEN. MINIMIZE EXPOSURE. Refrigerate.</p>	   

Section I. Chemical Product and Company Identification	
Chemical Name	1,3-Butadiene Diepoxide
Catalog Number	B0234
Synonym	1,2:3,4-Diepoxbutane
Chemical Formula	C ₄ H ₆ O ₂
CAS Number	1464-53-5
Supplier	TCI America 9211 N. Harborgate St. Portland OR 1-800-423-8616
In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients				
Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
1,3-Butadiene Diepoxide	1464-53-5	Min. 95.0 (GC)	This chemical is classified as a possible carcinogen. There is no acceptable exposure limit for a carcinogen.	Rat LD ₅₀ (oral) 78 mg/kg Mouse LD ₅₀ (oral) 72 mg/kg Rabbit LD ₅₀ (dermal) 89 uL/kg Rat LD ₅₀ (inhalation) 90 ppm/4H Mouse LD ₅₀ (intraperitoneal) 31 mg/kg

Section III. Hazards Identification	
Acute Health Effects	Highly toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	<p>CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Tumorigenic Effects. Rat TCLo Inhalation 5 ppm/6 hours/6 weeks intermittent TOXIC Effects: Tumorigenic - Neoplastic by RTECS criteria Sense Organs and Special Senses (Nose, Eye, Ear, and Taste) - Tumors Mouse TDLo Skin 95 gm/kg/78 weeks intermittent TOXIC Effects: Tumorigenic - Equivocal tumorigenic agent by RTECS criteria Skin and Appendages - Tumors Tumorigenic - Tumors at site of application Mouse TDLo Unreported 3400 mg/kg TOXIC Effects: Tumorigenic - Equivocal tumorigenic agent by RTECS criteria Blood - Lymphomas including Hodgkin's disease Skin and Appendages - Tumors DEVELOPMENTAL TOXICITY: Reproductive Effects. Rat TDLo Intraperitoneal 86.1 mg/kg, female 5-8 days of pregnancy TOXIC Effects: Effects on Embryo or Fetus - Extra embryonic structures Effects on Embryo or Fetus - Fetotoxicity Effects on Embryo or Fetus - Fetal death Rat TDLo Intraperitoneal 108 mg/kg, female 5-9 days of pregnancy TOXIC Effects: Effects on Embryo or Fetus - Extra embryonic structures Rat TDLo Intraperitoneal 86.1 mg/kg, female 5-8 days of pregnancy Effects on Fertility - Post-implantation mortality Effects on Embryo or Fetus - Extra embryonic structures Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.</p>

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
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. Thoroughly clean shoes before reuse. Get medical attention immediately.
Inhalation	If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.
Ingestion	INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Section V. Fire and Explosion Data

Flammability	Combustible.	Auto-Ignition	Not available.
Flash Points	45°C (113°F).	Flammable Limits	Not available.
Combustion Products	These products are toxic carbon oxides (CO, CO ₂).		
Fire Hazards	Not available.		
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.		
Fire Fighting Media and Instructions	Combustible liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Section VI. Accidental Release Measures

Spill Cleanup Instructions	This material is toxic by inhalation. Highly toxic material. Combustible material. Irritating material. Possibly carcinogenic material. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT get water inside container. DO NOT touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal.
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Section VII. Handling and Storage

Handling and Storage Information	TOXIC BY INHALATION. HIGHLY TOXIC. COMBUSTIBLE. IRRITATING. POSSIBLE CARCINOGEN. REFRIGERATE. Keep locked up. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. DO NOT ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Treat symptomatically and supportively.
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Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Boots. Gloves. A MSHA/NIOSH approved respirator must be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. 
Exposure Limits	This chemical is classified as a possible carcinogen. There is no acceptable exposure limit for a carcinogen.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid. (Clear light yellow)	Solubility	Not available.
Specific Gravity	1.12 (water=1)		
Molecular Weight	86.09	Partition Coefficient	Log P _{ow} : -1.84
Boiling Point	56 to 58°C (132.8 to 136.4°F) @ 33 mmHg	Vapor Pressure	3.3 kPa (@ 56°C)
Melting Point	2 to 4°C (35.6 to 39.2°F)	Vapor Density	Not available.
Refractive Index	1.4320 - 1.4350	Volatility	Not available.
Critical Temperature	Not available.	Odor	Not available.
Viscosity	Not available.	Taste	Not available.

Section X. Stability and Reactivity Data

Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	Avoid excessive heat and light.
Incompatibilities	Reactive with strong oxidizing agents.

Section XI. Toxicological Information

RTECS Number	EJ8225000
Routes of Exposure	Eye Contact. Ingestion. Inhalation.
Toxicity Data	Rat LD ₅₀ (oral) 78 mg/kg Mouse LD ₅₀ (oral) 72 mg/kg Rabbit LD ₅₀ (dermal) 89 uL/kg Rat LD ₅₀ (inhalation) 90 ppm/4H Mouse LD ₅₀ (intraperitoneal) 31 mg/kg
Chronic Toxic Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Tumorigenic Effects. Rat TCl _o Inhalation 5 ppm/6 hours/6 weeks intermittent TOXIC Effects: Tumorigenic - Neoplastic by RTECS criteria Sense Organs and Special Senses (Nose, Eye, Ear, and Taste) - Tumors Mouse TDLo Skin 95 gm/kg/78 weeks intermittent TOXIC Effects: Tumorigenic - Equivocal tumorigenic agent by RTECS criteria Skin and Appendages - Tumors Tumorigenic - Tumors at site of application Mouse TDLo Unreported 3400 mg/kg TOXIC Effects: Tumorigenic - Equivocal tumorigenic agent by RTECS criteria Blood - Lymphomas including Hodgkin's disease Skin and Appendages - Tumors DEVELOPMENTAL TOXICITY: Reproductive Effects. Rat TDLo Intraperitoneal 86.1 mg/kg, female 5-8 days of pregnancy TOXIC Effects: Effects on Embryo or Fetus - Extra embryonic structures Effects on Embryo or Fetus - Fetotoxicity Effects on Embryo or Fetus - Fetal death Rat TDLo Intraperitoneal 108 mg/kg, female 5-9 days of pregnancy TOXIC Effects: Effects on Embryo or Fetus - Extra embryonic structures Rat TDLo Intraperitoneal 86.1 mg/kg, female 5-8 days of pregnancy Effects on Fertility - Post-implantation mortality Effects on Embryo or Fetus - Extra embryonic structures Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Acute Toxic Effects	Highly toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity	Not available.
Environmental Fate	1,2:3,4-Diepoxybutane's production and use in curing polymers and crosslinking textile fibers may result in its release to the environment through various waste streams. If released to air, a vapor pressure of 3.9 mm Hg at 20 deg C indicates 1,2:3,4-diepoxybutane will exist solely as a vapor in the ambient atmosphere. Vapor-phase 1,2:3,4-diepoxybutane will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 16 days. If released to soil, 1,2:3,4-diepoxybutane is expected to have very high mobility based upon an estimated K _{oc} of 17. Volatilization from moist soil surfaces is not expected to be an important fate process based upon an estimated Henry's Law constant of 3.5X10 ⁻⁸ atm-cu m/mole. 1,2:3,4-Diepoxybutane may volatilize from dry soil surfaces based upon its vapor pressure. If released into water, 1,2:3,4-diepoxybutane is not expected to adsorb to suspended solids and sediment based upon the estimated K _{oc} . Volatilization from water surfaces is not expected to be an important fate process based upon this compound's estimated Henry's Law constant. An estimated BCF of 0.36 suggests the potential for bioconcentration in aquatic organisms is low. Based on experimentally determined hydrolysis rate constants of 7.5X10 ⁻³ to 5.0X10 ⁻³ /hr for 1,2:3,4-diepoxybutane at 37 deg C and neutral pH, calculated hydrolysis half-lives are 4-7 days. Occupational exposure to 1,2:3,4-diepoxybutane may occur through inhalation and dermal contact with this compound at workplaces where 1,2:3,4-diepoxybutane is produced or used.

Section XIII. Disposal Considerations

Waste Disposal Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

Section XIV. Transport Information

DOT Classification **FORBIDDEN**
DOT Class 6.1: Toxic material
DOT Class 3: Flammable material

PIN Number UN3384

Proper Shipping Name Toxic by inhalation, flammable, n.o.s.

Packing Group (PG) I (ZONE B)

DOT Pictograms

**Section XV. Other Regulatory Information and Pictograms**

TSCA Chemical Inventory (EPA) This compound is **ON** the EPA Toxic Substances Control Act (TSCA) inventory list.

WHMIS Classification (Canada) CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
On NDSL

EINECS Number (EEC) 215-979-1

EEC Risk Statements R23/24/25- Toxic by inhalation, in contact with skin and if swallowed.
R36/37/38- Irritating to eyes, respiratory system and skin.
R45- May cause cancer.

Japanese Regulatory Data Not available.

Section XVI. Other Information

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Notice to Reader

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.