SAFETY DATA SHEET

Updated on 06/11/2024

1. Material Identification

Product Name : Ethylene dibromide
Catalog Number : io-2364
CAS Number : 106-93-4
Identified uses : Laboratory chemicals, manufacture of chemical compounds
Company : Ionz

>> R&D Use only

2. Hazards Identification

GHS Classification:

Flammable liquid (category 2)
Acute toxicity, oral (Category 3)
Acute toxicity, dermal (Category 3)
Acute toxicity, inhalation (Category 3)
Specific target organ toxicity, single exposure (Category 1)

Pictogram(s)

GHS Hazard Statements

>> H301+H311+H331 (26.7%): Toxic if swallowed, in contact with skin or if inhaled [Danger Acute toxicity, oral; acute toxicity, dermal; acute toxicity, inhalation]

>> H301 (100%): Toxic if swallowed [Danger Acute toxicity, oral]

>> H311 (100%): Toxic in contact with skin [Danger Acute toxicity, dermal]

>> H315 (100%): Causes skin irritation [Warning Skin corrosion/irritation]

>> H319 (100%): Causes serious eye irritation [Warning Serious eye damage/eye irritation]

>> H331 (94.2%): Toxic if inhaled [Danger Acute toxicity, inhalation]

>> H335 (100%): May cause respiratory irritation [Warning Specific target organ toxicity, single exposure; Respiratory tract irritation]

>> H350 (99.2%): May cause cancer [Danger Carcinogenicity]

>> H411 (100%): Toxic to aquatic life with long lasting effects [Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P203, P261, P262, P264, P264+P265, P270, P271, P273, P280, P301+P316, P302+P352, P304+P340, P305+P351+P338, P316, P318, P319, P321, P330, P332+P317, P337+P317, P361+P364, P362+P364, P391, P403+P233, P405, and P501

NFPA 704 Diamond

NFPA Health Rating

>> 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

NFPA Fire Rating

>> 0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.

NFPA Instability Rating

>> 0 - Materials that in themselves are normally stable, even under fire conditions.

Health Hazards:

>> Local inflammation, blisters and ulcers on skin; irritation in lungs and organic injury to liver and kidneys; may be absorbed through skin. (USCG, 1999)

ERG 2024, Guide 154 (Ethylene dibromide)

>> TOXIC and/or CORROSIVE; inhalation, ingestion or skin contact with material may cause severe injury or death.

>> Contact with molten substance may cause severe burns to skin and eyes.

>> Avoid any skin contact.

>> Fire may produce irritating, corrosive and/or toxic gases.

>> Runoff from fire control or dilution water may be corrosive and/or toxic and cause environmental contamination.

>> Special Hazards of Combustion Products: Decomposition gases are toxic and irritating.

>> Behavior in Fire: Decomposes into toxic irritating gases. Reacts with hot metals such as aluminum and magnesium. (USCG, 1999)

ERG 2024, Guide 154 (Ethylene dibromide)

>> Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

>> Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.).

>> Corrosives in contact with metals may evolve flammable hydrogen gas.

>> Containers may explode when heated.

>> For electric vehicles or equipment, GUIDE 147 (lithium ion or sodium ion batteries) or GUIDE 138 (sodium batteries) should also be consulted.

>> Not combustible. Gives off irritating or toxic fumes (or gases) in a fire. Risk of fire and explosion. See Chemical Dangers.

Hazards Identification

ERG Hazard Classes

>> Toxic/poison by inhalation (TIH/PIH)

3. Composition/Information On Ingredients

Chemical name : Ethylene dibromide
CAS Number : 106-93-4
Molecular Formula : C2H4Br2
Molecular Weight : 187.8600 g/mol

4. First Aid Measures

First Aid:

>> EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

>> SKIN: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. IMMEDIATELY call a hospital or poison control center even if no symptoms (such as redness or irritation) develop. IMMEDIATELY transport the victim to a hospital for treatment after washing the affected areas.

>> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.

>> INGESTION: If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call a hospital or poison control center. Generally, the induction of vomiting is NOT recommended outside of a physician's care due to the risk of aspirating the chemical into the victim's lungs. However, if the victim is conscious and not convulsing and if medical help is not readily available, consider the risk of inducing vomiting because of the high toxicity of the chemical ingested. Ipecac syrup or salt water may be used in such an emergency. IMMEDIATELY transport the victim to a hospital. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital.

>> OTHER: Since this chemical is a known or suspected carcinogen you should contact a physician for advice regarding the possible long term health effects and potential recommendation for medical monitoring. Recommendations from the physician will depend upon the specific compound, its chemical, physical and toxicity properties, the exposure level, length of exposure, and the route of exposure. (NTP, 1992)

ERG 2024, Guide 154 (Ethylene dibromide)

>> General First Aid:

>> Call 911 or emergency medical service.

>> Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and avoid contamination.

>> Move victim to fresh air if it can be done safely.

>> Administer oxygen if breathing is difficult.

>> If victim is not breathing:

>> DO NOT perform mouth-to-mouth resuscitation; the victim may have ingestedor inhaled the substance.

>> If equipped and pulse detected, wash face and mouth, then give artificial respiration using a proper respiratory medical device (bag-valve mask, pocket mask equipped with a one-way valve or other device).

>> If no pulse detected or no respiratory medical device available, provide continuouscompressions. Conduct a pulse check every two minutes or monitor for any signs of spontaneous respirations.

>> Remove and isolate contaminated clothing and shoes.

>> For minor skin contact, avoid spreading material on unaffected skin.

>> In case of contact with substance, remove immediately by flushing skin or eyes with running water for at least 20 minutes.

>> For severe burns, immediate medical attention is required.

>> Effects of exposure (inhalation, ingestion, or skin contact) to substance may be delayed.

>> Keep victim calm and warm.

>> Keep victim under observation.

>> For further assistance, contact your local Poison Control Center.

>> Note: Basic Life Support (BLS) and Advanced Life Support (ALS) should be done by trained professionals.

>> Specific First Aid:

>> For corrosives, in case of contact, immediately flush skin or eyes with running water for at least 30 minutes. Additional flushing may be required.

>> In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the "ERAP" section.

First Aid Measures

Inhalation First Aid

>> Fresh air, rest. Half-upright position. Refer immediately for medical attention.

Skin First Aid

>> Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention .

Eye First Aid

>> First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Ingestion First Aid

>> Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Refer for medical attention .

5. Fire Fighting Measures

>> Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

>> SMALL FIRE: Dry chemical, CO2 or water spray.

>> LARGE FIRE: Dry chemical, CO2, alcohol-resistant foam or water spray. If it can be done safely, move undamaged containers away from the area around the fire. Dike runoff from fire control for later disposal.

>> FIRE INVOLVING TANKS, RAIL TANK CARS OR HIGHWAY TANKS: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. Do not get water inside containers. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks in direct contact with flames. (ERG, 2024)

>> In case of fire in the surroundings, use appropriate extinguishing media.

6. Accidental Release Measures

Isolation and Evacuation:

Isolation and evacuation measures to take when a large amount of this chemical is accidentally released in an emergency.

>> Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

>> IMMEDIATE PRECAUTIONARY MEASURE: Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.

>> SPILL: See ERG Table 1 - Initial Isolation and Protective Action Distances on the UN/NA 1605 datasheet.

>> FIRE: If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2024)

Evacuation: ERG 2024, Guide 154 (Ethylene dibromide)

>> Immediate precautionary measure

>> Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.

>> Spill

>> For non-highlighted materials: increase the immediate precautionary measure distance, in the downwind direction, as necessary.

>> Fire

>> If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

Isolation

>> Small spill:

>> ISOLATE in all directions: 30 m (100 ft)

>> Large spill:

Protection

>> Small spill:

>> PROTECT people from downwind during DAY time: 0.1 km (0.1 mi)

>> PROTECT people from downwind during NIGHT time: 0.1 km (0.1 mi)

>> Large spill:

>> PROTECT people from downwind during NIGHT time: 0.2 km (0.1 mi)

Spillage Disposal:

Methods for containment and safety measures to protect workers dealing with a spillage of this chemical.

>> Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Accidental Release Measures

Public Safety: ERG 2024, Guide 154 (Ethylene dibromide)

>> CALL 911. Then call emergency response telephone number on shipping paper. If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

>> Keep unauthorized personnel away.

>> Stay upwind, uphill and/or upstream.

>> Ventilate closed spaces before entering, but only if properly trained and equipped.

Spill or Leak: ERG 2024, Guide 154 (Ethylene dibromide)

>> ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.

>> Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

>> Stop leak if you can do it without risk.

>> Prevent entry into waterways, sewers, basements or confined areas.

>> Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

>> DO NOT GET WATER INSIDE CONTAINERS.

7. Handling And Storage

Safe Storage:

>> Separated from strong oxidants, strong bases, powdered metals and food and feedstuffs. See Chemical Dangers. Ventilation along the floor. Store in an area without drain or sewer access.

Storage Conditions:

>> Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Light sensitive. May darken on storage.

8. Exposure Control/ Personal Protection

REL-TWA (Time Weighted Average)

>> 0.045 ppm

REL-C (Ceiling)

>> 0.13 ppm [15 minutes]

>> Ca TWA 0.045 ppm C 0.13 ppm [15-minute] See Appendix A

>> 20.0 [ppm], Ceiling(OSHA) = 30 ppm (50 ppm for 5-min peak per 8-hour shift)

PEL-TWA (8-Hour Time Weighted Average)

>> 20 ppm

PEL-C (Ceiling)

>> 30 ppm [5 minutes]; 50 ppm (Peak) [5 minutes for 8 hr shift]

>> Skin. A3: Confirmed animal carcinogen with unknown relevance to humans.

>> (skin); A3 (confirmed animal carcinogen with unknown relevance to humans).

EU-OEL

>> 0.8 mg/m

MAK (Maximale Arbeitsplatz Konzentration)

>> skin absorption (H); carcinogen category: 2.

Emergency Response: ERG 2024, Guide 154 (Ethylene dibromide)

>> Small Fire

>> Dry chemical, CO2 or water spray.

>> Large Fire

>> Dry chemical, CO2, alcohol-resistant foam or water spray.

>> If it can be done safely, move undamaged containers away from the area around the fire.

>> Dike runoff from fire control for later disposal.

>> Fire Involving Tanks, Rail Tank Cars or Highway Tanks

>> Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles.

>> Do not get water inside containers.

>> Cool containers with flooding quantities of water until well after fire is out.

>> Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

>> ALWAYS stay away from tanks in direct contact with flames.

Inhalation Risk:

>> A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20 °C.

Effects of Short Term Exposure:

>> The substance is irritating to the eyes, skin and respiratory tract. The substance may cause effects on the liver and kidneys. This may result in tissue lesions. Exposure at high concentrations could cause lowering of consciousness and death. The effects may be delayed.

Effects of Long Term Exposure:

>> Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys, resulting in impaired functions. This substance is probably carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

Fire Prevention

>> NO contact with incompatible materials: See Chemical Dangers

Exposure Prevention

>> AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!

Inhalation Prevention

>> Use ventilation, local exhaust or breathing protection.

Skin Prevention

>> Protective gloves. Protective clothing.

Eye Prevention

>> Wear safety goggles, face shield or eye protection in combination with breathing protection.

Ingestion Prevention

>> Do not eat, drink, or smoke during work.

Exposure Control and Personal Protection

Protective Clothing: ERG 2024, Guide 154 (Ethylene dibromide)

>> Wear positive pressure self-contained breathing apparatus (SCBA).

>> Wear chemical protective clothing that is specifically recommended by the manufacturer when there is NO RISK OF FIRE.

>> Structural firefighters' protective clothing provides thermal protection but only limited chemical protection.

Exposure Summary

>> TIH (Toxic Inhalation Hazard) - Term used to describe gases and volatile liquids that are toxic when inhaled. Some are TIH materials themselves, e.g., chlorine, and some release TIH gases when spilled in water, e.g., chlorosilanes. [ERG 2016].

9. Physical And Chemical Properties

Molecular Weight:

>> 187.86

Exact Mass:

>> 187.86593

Physical Description:

>> Ethylene dibromide appears as a clear colorless liquid with a sweetish odor. Density 18.1 lb /gal. Slightly soluble in water. Soluble in most organic solvents and thinners. Noncombustible. Very toxic by inhalation, skin absorption or ingestion. Used as a solvent, scavenger for lead in gasoline, grain fumigant and in the manufacture of other chemicals.

>> COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR. TURNS BROWN ON EXPOSURE TO LIGHT.

Color/Form:

>> Heavy liquid

Odor:

>> Chloroform odor

Boiling Point:

>> 268 to 270 °F at 760 mmHg (NTP, 1992)

>> 131 °C

Melting Point:

>> 49.9 °F (NTP, 1992)

>> 10 °C

Solubility:

>> less than 1 mg/mL at 70 °F (NTP, 1992)

>> Solubility in water, g/100ml at 20 °C: 0.34 (poor)

Density:

>> 2.18 at 68 °F (USCG, 1999) - Denser than water; will sink

>> Relative density (water = 1): 2.2

Vapor Density:

>> 6.48 (NTP, 1992) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 6.5

Vapor Pressure:

>> 11 mmHg at 68 °F ; 17.4 mmHg at 86 °F (NTP, 1992)

>> Vapor pressure, kPa at 20 °C: 1.5

LogP:

>> log Kow = 1.96

>> 1.96

Stability/Shelf Life:

>> Stable under recommended storage conditions.

Autoignition Temperature:

>> Not flammable (USCG, 1999)

Decomposition:

>> Hazardous decomposition products formed under fire conditions - Carbon oxides, hydrogen bromide gas.

Viscosity:

>> 1.727 cP at 20 °C

Corrosivity:

The ability of a chemical to damage or destroy other substances when it comes into contact.

>> Liquid ethylene dibromide will attack some forms of plastics, rubber, and coatings.

Heat of Combustion:

>> Heat of combustion in an oxygen bomb is 6647 J/g (1289 cal/g).

Heat of Vaporization:

>> 82.1 BTU/lb = 45.6 cal/g = 1.91X10+5 J/kg

Surface Tension:

>> 38.75 dynes/cm = 0.03875 Newtons/m at 20 °C; Liquid-water interfacial tension: 36.54 dynes at 20 °C

Ionization Potential:

>> 9.45 eV

Odor Threshold:

>> Low: 76.80 mg/cu m; High: 62.50 mg/cu m.

Refractive Index:

>> Index of refraction: 1.5356 at 20 °C/D

10. Stability And Reactivity

>> Slightly soluble in water. May react slowly with moisture.

11. Toxicological Information

Toxicity Summary:

>> IDENTIFICATION AND USE: Ethylene dibromide (1,2-Dibromoethane) is a colorless liquid. Historically, the primary use of 1,2-dibromoethane has been as a lead scavenger in antiknock mixtures added to gasolines. Another major past use of 1,2-dibromoethane was as a pesticide and an ingredient of soil and grain fumigants and for post-harvest application. 1,2-Dibromoethane has been used as a chemical intermediate in the manufacture of resins, gums, waxes, dyes, and pharmaceuticals and as a high-density, nonflammable solvent. HUMAN STUDIES: 1,2-Dibromoethane has produced oral ulcerations, followed by liver and renal toxicity. Cases of fatal poisoning have been reported. It was a DNA damaging agent when tested in human lymphocytes, but positive results were noted only after metabolic activation. ANIMAL STUDIES: Dogs exposed for 1 to 1.5 hr to vapor of 1,2-dibromoethane developed clouding of corneas several hours after removal from the exposure chamber. Rats tolerated exposure to 25 ppm 1,2-dibromoethane in air over 7 hr/day for 151 days, but 63 similar exposures to levels of 50 ppm were lethal to 20-50% of animals. Deaths from acute exposure were usually due to lung congestion and hemorrhage although liver and kidney damage, as well as corneal injury, were also observed. 1,2-Dibromoethane caused tumors in rats and mice at several different tissue sites and by several different routes of exposure. Inhalation exposure to 1,2-dibromoethane caused cancer of the nasal cavity and the blood vessels in rats of both sexes and in female mice; benign or malignant lung tumors in mice of both sexes and in female rats; and benign or malignant mammary gland tumors in females of both species. It also caused testicular tumors in male rats and cancer of the subcutaneous tissue in female mice. Dermal exposure to 1,2-dibromoethane caused lung and skin tumors in female mice. In mice, administration of 1,2-dibromoethane in the drinking water caused forestomach tumors in both sexes and benign tumors of the esophagus in females. Some of the male reproductive effects of ethylene dibromide in the human have been modelled in the rabbit, although the rabbit appears not to be as sensitive, since semen parameters were affected only at doses close to the LD50 (55 mg/kg). When given ip at dose of 10 mg/kg on 5 successive days to rats it damaged spermatogenic cells. Two to three weeks after start of oral treatment of bulls with 4 mg/kg bw 1,2-dibromoethane on alternate days, abnormal spermatozoa were observed, indicating interference with spermatogenesis and with maturation of spermatozoa in epididymis. Fetal abnormalities were observed when pregnant rats and mice were exposed at 31.6 ppm 1,2-dibromoethane for 23 hr a day during the 6th-15th days of gestation. 1,2-Dibromoethane bound covalently to liver DNA of rats treated in vivo. It was selectively lethal to DNA-repair-deficient bacteria, and provoked DNA repair in cultured mammalian cells. It was mutagenic to bacteria, fungi, vascular plants,

insects and cultured mammalian cells in the absence of an exogenous metabolic activation system. It induced chromosomal aberrations and sister chromatid exchanges in cultured mammalian cells. ECOTOXICITY STUDIES: 1,2-Dibromoethene showed low toxicity to most aquatic species tested. It was phytotoxic for green plants and germinating seed.

USGS Health-Based Screening Levels for Evaluating Water-Quality:

This section provides the USGS Health-Based Screening Levels for Evaluating Water-Quality data.

Chemical

>> 1,2-Dibromoethane

USGS Parameter Code

>> 77651

MCL (Maximum Contaminant Levels)[µg/L]

>> 0.05

Benchmark Remarks

>> Synonym Ethylene dibromide

Reference

>> Smith, C.D. and Nowell, L.H., 2024. Health-Based Screening Levels for evaluating water-quality data (3rd ed.). DOI:10.5066/F71C1TWP

Evidence for Carcinogenicity:

Evidence that this chemical does or may cause cancer. The information here is collected from various sources by the Hazardous Substances Data Bank (HSDB).

>> Cancer Classification: Group B2 Probable Human Carcinogen

Carcinogen Classification:

This section provides the International Agency for Research on Cancer (IARC) Carcinogenic Classification and related monograph links. In the IARC Carcinogenic classification, chemicals are categorized into four groups: Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), Group 2B (possibly carcinogenic to humans), and Group 3 (not classifiable as to its carcinogenicity to humans).

IARC Carcinogenic Agent

>> Ethylene dibromide

IARC Carcinogenic Classes

>> Group 2A: Probably carcinogenic to humans

IARC Monographs

>> Volume 15: (1977) Some Fumigants, the Herbicides 2,4-D and 2,4,5-T, Chlorinated Dibenzodioxins and Miscellaneous Industrial Chemicals

>> Volume Sup 7: Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs Volumes 1 to 42, 1987; 440 pages; ISBN 92-832-1411-0 (out of print)

>> Volume 71: (1999) Re-evaluation of Some Organic Chemicals, Hydrazine and Hydrogen Peroxide (Part 1, Part 2, Part 3)

Additional information

>> NB Overall evaluation upgraded to Group 2A with supporting evidence from other relevant data

>> 2A, probably carcinogenic to humans. (L135)

Health Effects:

>> Long term exposure can result in liver, kidney, and reproductive system damage. 1,2-Dibromoethane is also known to have adverse effects on the brain. (L120)

Exposure Routes:

>> The substance can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion.

>> inhalation, skin absorption, ingestion, skin and/or eye contact

Inhalation Exposure

>> Burning sensation. Cough. Laboured breathing. Shortness of breath. Vomiting. Drowsiness. Unconsciousness.

Skin Exposure

>> MAY BE ABSORBED! Redness. Pain.

Eye Exposure

>> Redness. Pain.

Ingestion Exposure

>> Abdominal pain. Vomiting. Drowsiness.

>> irritation eyes, skin, respiratory system; dermatitis with vesiculation; liver, heart, spleen, kidney damage; reproductive effects; [potential occupational carcinogen]

Target Organs:

Organs that are affected by exposure to this chemical. Information in this section reflects human data unless otherwise noted.

>> Body Weight, Cancer, Gastrointestinal (Stomach and Intestines, part of the digestive system), Hepatic (Liver), Renal (Urinary System or Kidneys), Reproductive (Producing Children)

>> Endocrine

>> Hepatic

>> Reproductive

>> Respiratory

Cancer Sites:

The site in which cancer develops due to exposure to this compound. Cancers are casually referred to based on their primary sites (e.g., skin, lung, breasts, prostate, colon and rectum).

>> Endocrine

>> Gastrointestinal

>> Reproductive

>> Respiratory

>> [in animals: skin & lung tumors]

Adverse Effects:

An adverse effect is an undesired harmful effect resulting from a medical treatment or other intervention.

>> Neurotoxin - Acute solvent syndrome

>> Occupational hepatotoxin - Primary hepatotoxins: the toxic effect to the liver is the principal adverse effect of the chemical.

>> Nephrotoxin - The chemical is potentially toxic to the kidneys in the occupational setting.

>> Reproductive Toxin - A chemical that is toxic to the reproductive system, including defects in the progeny and injury to male or female reproductive function. Reproductive toxicity includes developmental effects. See Guidelines for Reproductive Toxicity Risk Assessment.

>> IARC Carcinogen - Class 2: International Agency for Research on Cancer classifies chemicals as probable (2a), or possible (2b) human carcinogens.

>> NTP Carcinogen - Reasonably anticipated to be a human carcinogen.

>> ACGIH Carcinogen - Confirmed Animal.

Toxicity Data:

>> LC50 (rat) = 1,831 ppm/30 min

Interactions:

>> Ethylene dibromide (EDB) has been used as a model compound for eliciting hepato- and nephrotoxicity. Conjugation with glutathione (GSH) has been shown to play a role in the bioactivation of EDB. The aim of this study was to determine whether activation of alpha(1)-adrenergic receptors, which causes a decrease in cellular GSH levels, could modulate the nephrotoxicity of EDB. For this purpose, male ICR mice were treated with EDB and/or the alpha-adrenergic agonist, phenylephrine (Pe), or the alpha-adrenergic antagonist, phentolamine (Phe). Animals treated with EDB (40 mg/kg, i.p.) had a 9.3-fold increase in urinary gamma-glutamyltranspeptidase (GGTP: EC 2.3.2.2) activity and a 38% decrease in renal non-protein bound sulfhydryl (NPSH) levels; however, animals co-treated with EDB and Pe (50 mg/kg, i.p.) exhibited a 27.8-fold increase in urinary GGTP activity and a 60% decrease in NPSH levels. The enhanced presence of urinary GGTP and decrease in cellular levels of NPSH was nearly blocked by treating animals concomitantly with EDB and Phe (10 mg/kg, i.p.) or EDB, Pe, and Phe. Histopathological examination revealed the enhanced degree of tissue damage and necrosis following treatment with EDB and Pe, and the protective effect of Phe at ameliorating EDB toxicity. These results indicate that factors that can influence alpha-adrenergic receptors may be critical in assessing dose-response data used in the risk assessment process.

Antidote and Emergency Treatment:

>> Immediate First Aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valvle resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR if necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomoting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Bromine, methyl bromide, and related compounds/

Human Toxicity Excerpts:

>> /SIGNS AND SYMPTOMS/ Liq on skin causes blisters if evaporation is delayed. Inhalation causes delayed pulmonary lesions. Drowsiness occurs ... death appears to be due to resp or circulatory failure, complicated by pulmonary edema. Fatal acute intoxications are rare since fume concn great enough to cause serious illness in short exposures have a definite and sickening odor ... .

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ ... Three dogs exposed for 1 to 1.5 hr to vapor of 1 to 5 cc of 1,2-dibromoethane in 1,000 L of air developed clouding of corneas several hours after removal from exposure chamber.

Non-Human Toxicity Values:

>> LD50 Rat dermal 300 mg/kg

National Toxicology Program Studies:

Reports from the National Toxicology Program, an interagency program supported by three government agencies (NIH, FDA, and CDC) within the Department of Health and Human Services. This program plays a critical role in generating, interpreting, and sharing toxicological information about chemicals of public health concerns.

>> A bioassay for possible carcinogenicity of technical grade 1,2-dibromoethane was conducted using Osborne-Mendel rats and B6C3F1 mice. 1,2-Dibromoethane in corn oil was administered by gavage, at either of two dosages, to groups of 50 male and 50 female animals of each species. The time weighted avg high and low doses of 1,2-dibromoethane used in the chronic bioassay were, respectively, 41 and 38 mg/kg/day for male rats, 39 and 37 mg/kg/day for female rats and 107 and 62 mg/kg/day for mice of both sexes. For each species 20 animals of each sex were placed on test as vehicle controls. These animals were gavaged with corn oil with the same frequency that dosed animals were gavaged with 1,2-dibromoethane mixtures. Twenty animals of each sex were placed on test as untreated controls for each species. These animals were not intubated. ... Under the conditions of this bioassay 1,2-dibromoethane was carcinogenic to Osborne-Mendel rats and B6C3F1 mice. The cmpd induced squamous cell carcinomas of the forestomach in rats of both sexes, hepatocellular carcinomas in female rats, and hemangiosarcomas in male rats. In mice of both sexes, the cmpd induced squamous cell carcinomas of the forestomach and alveolar/bronchiolar adenomas. Levels of Evidence of Carcinogenicity: Male Rats: Positive; Female Rats: Positive; Male Mice: Positive; Female Mice: Positive.

Populations at Special Risk:

>> ... /Individuals/ ... with diseases of liver and kidney.

12. Ecological Information

Resident Soil (mg/kg)

>> 3.60e-02

Industrial Soil (mg/kg)

>> 1.60e-01

Resident Air (ug/m3)

>> 4.70e-03

Industrial Air (ug/m3)

>> 2.00e-02

Tapwater (ug/L)

>> 7.50e-03

MCL (ug/L)

>> 5.00e-02

Risk-based SSL (mg/kg)

>> 2.1e-06

MCL-based SSL (mg/kg)

>> 1.4e-05

Oral Slope Factor (mg/kg-day)-1

>> 2.00e+00

Inhalation Unit Risk (ug/m3)-1

>> 6.00e-04

Chronic Oral Reference Dose (mg/kg-day)

>> 9.00e-03

Chronic Inhalation Reference Concentration (mg/m3)

>> 9.00e-03

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Soil Saturation Concentration (mg/kg)

>> 1.34e+03

ICSC Environmental Data:

>> The substance is harmful to aquatic organisms.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SOIL: No detectable residues of ethylene dibromide were found in soil or dustfall at bulk gasoline handling facilities in New Jersey and Oklahoma. Minimum detectable quantity was 10-15 ng/sample. Nanogram per gram levels were found in the soil at two citrus fumigation centers in Florida where the dustfall ranged from 6-363 picograms per square centimeter per hr(1).

Average Daily Intake:

The average amount of the compound taken into the body through eating, drinking, or breathing.

>> Estimated daily intake (ug/kg/day) of EDB by geographic region /USA/: Northeast, citrus: 0.00052, grain: 0.0051; North Central, citrus: 0.005, grain: 0.0052; South, citrus: 0.003, grain: 0.0059; West, citrus: 0.00074, grain: 0.0052 /From table/.

13. Disposal Considerations

Spillage Disposal

>> Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Disposal Methods

>> Generators of waste (equal to or greater than 100 kg/mo) containing this contaminant, EPA hazardous waste number U067, must conform with USEPA regulations in storage, transportation, treatment and disposal of waste.

>> Product: Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a

chemical incinerator equipped with an afterburner and scrubber; Contaminated packaging: Dispose of as unused product.

>> SRP: Wastewater from contaminant suppression, cleaning of protective clothing/equipment, or contaminated sites should be contained and evaluated for subject chemical or decomposition product concentrations. Concentrations shall be lower than applicable environmental discharge or disposal criteria. Alternatively, pretreatment and/or discharge to a permitted wastewater treatment facility is acceptable only after review by the governing authority and assurance that "pass through" violations will not occur. Due consideration shall be given to remediation worker exposure (inhalation, dermal and ingestion) as well as fate during treatment, transfer and disposal. If it is not practicable to manage the chemical in this fashion, it must be evaluated in accordance with EPA 40 CFR Part 261, specifically Subpart B, in order to determine the appropriate local, state and federal requirements for disposal.

>> Ethylene dibromide is a waste chemical stream constituent which may be subjected to ultimate disposal by controlled incineration. Controlled incineration with adequate scrubbing and ash disposal facilities.

>> For more Disposal Methods (Complete) data for Ethylene dibromide (14 total), please visit the HSDB record page.

14. Transport Information

DOT

Ethylene dibromide
6.1
UN Pack Group: I
Reportable Quantity of 1 lb or 0

IATA

Ethylene dibromide
6.1,
UN Pack Group: I

15. Regulatory Information

Federal Drinking Water Standards:

Federal drinking water standards (e.g. maximum containment level (MCL)) for this chemical. These standards are legally enforceable.

>> Maximum contaminant levels (MCL) for synthetic organic contaminants apply to community water systems and non-transient, non-community water systems: ethylene dibromide, MCL 0.00005 mg/L.

Federal Drinking Water Guidelines:

Federal drinking water guidelines (e.g. maximum containment level (MCL)) for this chemical. In general, these guidelines are recommendations and not legally enforceable.

>> The maximum contaminant level goal (MCLG) for the following organic contaminant is zero mg/L: ethylene dibromide.

State Drinking Water Standards:

State drinking water standards (e.g. maximum containment level (MCL)) for this chemical. These standards are legally enforceable.

>> (FL) FLORIDA 0.02 ug/L

Clean Water Act Requirements:

The Clean Water Act (CWA) of 1972 establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under CWA, the U.S. Environmental Protection Agency (EPA) developed the Toxic Pollutant List (40 CFR Part 401.15) and the Priority Pollutant List (40 CFR Part 423, Appendix A). These lists are to be used by EPA and States to develop the Effluent Guidelines regulations and ensure water quality criteria and standards.

>> Ethylene dibromide is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to

discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Ethane, 1,2-dibromo-

California Safe Cosmetics Program (CSCP) Reportable Ingredient

>> Hazard Traits - Carcinogenicity; Developmental Toxicity; Hazard Trait Under Review; Hepatotoxicity and Digestive System Toxicity; Nephrotoxicity and Other Toxicity to the Urinary System; Reproductive Toxicity

>> Authoritative List - CA MCLs; CA TACs; CWA 303(d); EC Annex VI CMRs - Cat. 1B; IARC Carcinogens - 2A; IRIS Carcinogens - Likely Carcin.; NTP RoC - reasonable; OEHHA RELs; Prop 65

>> Report - regardless of intended function of ingredient in the product

REACH Registered Substance

>> Status: Active Update: 26-04-2022 https://echa.europa.eu/registration-dossier/-/registered-dossier/13105

>> Status: Active Update: 27-10-2020 https://echa.europa.eu/registration-dossier/-/registered-dossier/31811

New Zealand EPA Inventory of Chemical Status

>> 1,2-Dibromoethane: HSNO Approval: HSR002992 Approved with controls

16. Other Information

Toxic Combustion Products:

Toxic products (e.g., gases and vapors) produced from the combustion of this chemical.

>> When heated to decomp ... emits toxic fumes of /hydrogen bromide/.

Other Safety Information

Chemical Assessment

>> IMAP assessments - Ethane, 1,2-dibromo-: Human health tier II assessment

>> IMAP assessments - Ethane, 1,2-dibromo-: Environment tier II assessment

"The information provided is believed to be accurate but is not comprehensive and should be used as a reference. It reflects our current knowledge and is intended for safety guidance related to the product. This document does not constitute a warranty of the product's properties. Ionz is not responsible for any damages resulting from handling or contact with the product incorrectly."