ionz

SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : 1,2-Dichloroethylene
Catalog Number : io-2158
CAS Number : 156-60-5
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

>> H225 (100%): Highly Flammable liquid and vapor [Danger Flammable liquids]

>> H319 (38.1%): Causes serious eye irritation [Warning Serious eye damage/eye irritation]

>> H332 (99.7%): Harmful if inhaled [Warning Acute toxicity, inhalation]

>> H336 (36%): May cause drowsiness or dizziness [Warning Specific target organ toxicity, single exposure; Narcotic effects]

>> H412 (99.7%): Harmful to aquatic life with long lasting effects [Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P210, P233, P240, P241, P242, P243, P261, P264+P265, P271, P273, P280, P303+P361+P353, P304+P340, P305+P351+P338, P317, P319, P337+P317, P370+P378, P403+P233, P403+P235, P405, and P501

NFPA 704 Diamond

NFPA Health Rating

>> 1 - Materials that, under emergency conditions, can cause significant irritation.

NFPA Fire Rating

>> 3 - Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions.

NFPA Instability Rating

>> 2 - Materials that readily undergo violent chemical changes at elevated temperatures and pressures.

NFPA Specific Notice

>> W - No water: Materials that react violently or explosively with water.

Health Hazards:

>> SYMPTOMS: Symptoms of exposure to this compound may include irritation of the skin and eyes, mucous membranes and upper respiratory tract. It may also cause dizziness, nausea, frequent vomiting, central nervous system intoxication and transient renal effects. Other symptoms include sleep disturbances and hallucinations. It can cause weakness, tremor, cramps and dermatitis. It may also cause drowsiness and unconsciousness. Other symptoms include conjunctivitis and narcosis.

>> ACUTE/CHRONIC HAZARDS: The vapor of this compound is heavier than air and may travel to a source of ignition and flash back. This chemical can cause skin and eye irritation. When heated to decomposition it emits toxic fumes of hydrogen chloride gas, carbon monoxide, carbon dioxide and phosgene. It is moderately toxic by ingestion, inhalation and skin contact. High concentrations may be narcotic. (NTP, 1992)

>> This compound is flammable. (NTP, 1992)

>> Highly flammable. Gives off irritating or toxic fumes (or gases) in a fire. Vapour/air mixtures are explosive.

3. Composition/Information On Ingredients

Chemical name : 1,2-Dichloroethylene
CAS Number : 156-60-5
Molecular Formula : C2H2Cl2
Molecular Weight : 96.9400 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. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.

>> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. 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: DO NOT INDUCE VOMITING. Volatile chemicals have a high risk of being aspirated into the victim's lungs during vomiting which increases the medical problems. 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. 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. (NTP, 1992)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest. Refer for medical attention.

Skin First Aid

>> Remove contaminated clothes. Rinse skin with plenty of water or shower.

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. Give one or two glasses of water to drink. Refer for medical attention .

5. Fire Fighting Measures

>> Vapors are heavier than air and may travel to a source of ignition and flash back. ... Closed containers may rupture violently when heated.

>> Fires involving this material should be controlled using a dry chemical, carbon dioxide or Halon extinguisher. A water spray may also be used. (NTP, 1992)

>> Use water spray, powder, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

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 130 [Flammable Liquids (Water-Immiscible / Noxious); polymerization hazard]:

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

>> LARGE SPILL: Consider initial downwind evacuation for at least 300 meters (1000 feet).

>> 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)

Spillage Disposal:

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

>> Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Remove all ignition sources. Do NOT wash away into sewer. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in dry sand or inert absorbent. Then store and dispose of according to local regulations.

7. Handling And Storage

Safe Storage:

>> Fireproof. Well closed. See Chemical Dangers.

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. Air, light, and moisture sensitive.

8. Exposure Control/ Personal Protection

>> TWA 200 ppm (790 mg/m3)

>> 200.0 [ppm]

>> 200.0 [ppm]

>> 200 ppm as TWA.

MAK (Maximale Arbeitsplatz Konzentration)

>> 800 mg/m

Inhalation Risk:

>> A harmful contamination of the air will be reached quickly on evaporation of this substance at 20 °C; on spraying or dispersing, however, much faster.

Effects of Short Term Exposure:

>> The substance is irritating to the eyes and respiratory tract. The substance may cause effects on the central nervous system at high levels. This may result in lowering of consciousness.

Effects of Long Term Exposure:

>> The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the liver.

Fire Prevention

>> NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.

Exposure Prevention

>> STRICT HYGIENE!

Inhalation Prevention

>> Use ventilation, local exhaust or breathing protection.

Skin Prevention

>> Protective gloves.

Eye Prevention

>> Wear safety spectacles.

Ingestion Prevention

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

Exposure Control and Personal Protection

Maximum Allowable Concentration (MAK)

>> 200.0 [ppm]

Maximum Allowable Concentration (MAK)

>> 200.0 [ppm]

9. Physical And Chemical Properties

Molecular Weight:

>> 96.94

Exact Mass:

>> 95.9533555

Physical Description:

>> 1,2-dichloroethylene, (trans isomers) is a clear colorless liquid with a pleasant odor. Flash point 43 °F.

>> COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Color/Form:

>> Colorless liquid (usually a mixture of the cis- and trans-isomers) ...

Odor:

>> Ethereal, slightly acrid

Boiling Point:

>> 117 °F at 745 mmHg (NTP, 1992)

>> 55 °C

Melting Point:

>> -58 °F (NTP, 1992)

Flash Point:

>> 43 °F (NTP, 1992)

>> 2 °C c.c.

Solubility:

>> less than 1 mg/mL at 64 °F (NTP, 1992)

>> Solubility in water: poor

Density:

>> 1.2743 at 77 °F (NTP, 1992) - Denser than water; will sink

>> Relative density (water = 1): 1.28

Vapor Density:

>> 3.34 (NTP, 1992) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 3.34

Vapor Pressure:

>> 200 mmHg at 57 °F ; 400 mmHg at 87.4 °F (NTP, 1992)

LogP:

>> log Kow = 1.86

>> 2

Stability/Shelf Life:

>> Stable under recommended storage conditions.

Autoignition Temperature:

>> 860 °F (NTP, 1992)

>> 460 °C

Decomposition:

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

Viscosity:

>> 0.41 cP at 20 °C

Corrosivity:

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

>> 1,2-Dichloroethylene will attack some forms of plastics, rubber, and coatings.

Heat of Combustion:

>> -4847.2 Btu/lb = -2692.9 cal/g = -112.67X10+5 J/kg

Heat of Vaporization:

>> 130 Btu/lb = 72 cal/g = 3.0X10+5 J/kg

Surface Tension:

>> 24 dynes/cm = 0.024 N/m at 20 °C

Ionization Potential:

>> 9.65 eV

Polymerization:

Polymerization is a process of reacting monomer molecules together in a chemical reaction to form polymer chains or three-dimensional networks.

>> Hazardous polymerization may occur. Polymerization may be caused by elevated temperature, oxidizing materials, peroxides, or sunlight. Usually contains inhibitors to prevent polymerization. Uninhibited monomer vapor may form

polymer in vents and other confined spaces.

Odor Threshold:

>> Odor Threshold Low: 0.08 [mmHg]

>> Odor Threshold High: 17.0 [mmHg]

>> Odor threshold from "Quick Guide: The Electronic NIOSH Pocket Guide to Chemical Hazards"

Refractive Index:

>> Index of refraction: 1.4454 at 20 °C

10. Stability And Reactivity

>> Highly flammable. Oxidizes in air to form unstable peroxides that may explode spontaneously. Insoluble in water.

>> Highly Flammable

>> Polymerizable

11. Toxicological Information

Toxicity Summary:

>> IDENTIFICATION AND USE: 1,2-Dichloroethylene (DCE) is a colorless mobile liquid. It is used as a refrigerant, in the manufacture of pharmaceuticals and artificial pearls, and in the extraction of oils and fats from fish and meat. It is also a solvent for fats, phenol, camphor, and an intermediate in synthesis of chlorinated solvents and compounds. HUMAN STUDIES: Clinical effects caused by acute exposure to DCE include central nervous system and respiratory depression, eye and upper respiratory irritation, nausea, vomiting, weakness, tremors, and epigastric cramps, all of which may resolve rapidly after the exposure ceases. The investigation of workers exposed to DCE indicated that prematurities among exposed female workers and wives of exposed male workers were higher than that of control groups. The DNA breakage capacity and the cytotoxicity of DCE was assessed in the alkaline single cell gel electrophoresis test (comet assay) with and without metabolic activation in isolated human lymphocytes. DCE induced DNA breakage, in the presence or absence of the metabolic activation system. ANIMAL STUDIES: Some but not all dogs experienced CNS depression by inhaling the DCE vapor and have developed delicate superficial corneal turbidity. A subchronic inhalation study was conducted in which rats, rabbits, guinea pigs, and beagle dogs were exposed to 0, 500, or 1,000 ppm (0, 1,980, or 3,960 mg/cu m) DCE mixture (58% cis-, 42% trans- isomer), 7 hours/day for 6 months. No significant toxicity was found. Behavioral changes have been observed in mice exposed for 4 hr to DCE. The reported changes consisted of a dose-related decrease in the duration of immobility in the "behavioral despair" swimming test. A 45% decrease in the total duration of immobility occurred at a concentration of 1,720 ppm. Gonadotoxicity and embryotoxicity were found in rodents exposed to concentration of DCE at 24.8 mg/cu m. DCE could reach the fetus through the placenta. Cis,trans-DCE was found to be negative when tested for mutagenicity using the Salmonella/microsome preincubation assay in as many as 5 Salmonella typhimurium strains (TA1535, TA1537, TA97, TA98, and TA100) in the presence and absence of metabolic activation.

EPA Provisional Peer-Reviewed Toxicity Values:

This section provides the EPA Provisional Peer-Reviewed Toxicity Values (PPRTVs) and links of related assessment documents.

Chemical Substance

>> trans-1,2-Dichloroethylene

Reference Concentration (RfC), Chronic

>> 4 x 10^-2 mg/m^3

Reference Concentration (RfC), Subchronic

>> 4 x 10^-1 mg/m^3

PPRTV Assessment

>> PDF Document

Weight-Of-Evidence (WOE)

>> See the IRIS entry for trans-1,2-Dichloroethylene

Last Revision

>> 2020

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

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

Chemical

>> trans-1,2-Dichloroethylene

USGS Parameter Code

>> 34546

MCL (Maximum Contaminant Levels)[µg/L]

>> 100

Reference

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

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).

>> No indication of carcinogenicity (not listed by IARC). (L135)

Health Effects:

>> Breathing trans-1,2-DCE can cause sever liver and kidney damages, pulmonary capillary hyperemia, as well as alveolar septal distention; depression of the central nervous sustem can occur; moderate iritis and conjunctivitis can follow eye exposure; dermatitis and irritation of mucous membranes can follow dermal exposure. Symptoms associated with lethal oral doses included decreased activity, ataxia, suppressed or total loss of righting reflex, and depressed respiration. (L585)

Exposure Routes:

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

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

Inhalation Exposure

>> Cough. Sore throat. Dizziness. Nausea. Drowsiness. Weakness. Unconsciousness. Vomiting.

Skin Exposure

>> Dry skin.

Eye Exposure

>> Redness. Pain.

Ingestion Exposure

>> Abdominal pain. Further see Inhalation.

>> irritation eyes, respiratory system; central nervous system depression

Target Organs:

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

>> Dermal (Skin), Immunological (Immune System), Ocular (Eyes)

>> Immune

Adverse Effects:

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

>> Neurotoxin - Acute solvent syndrome

>> Occupational hepatotoxin - Secondary hepatotoxins: the potential for toxic effect in the occupational setting is based on cases of poisoning by human ingestion or animal experimentation.

Toxicity Data:

>> LC50 (mice) = 21,723 ppm/6H (trans-isomer);

Minimum Risk Level:

The minimal risk level (MRL) is an estimate of the amount of a chemical a person can eat, drink, or breathe each day without a detectable risk to health

>> Acute Inhalation: 0.2 ppm (Rat) (L585) Acute Oral: 1 mg/kg/day (Rat) (L585) Intermediate Oral: 0.3 mg/kg/day (L585)

Treatment:

Treatment when exposed to toxin

>> Following inhalation exposure, move patient to fresh air. Monitor for respiratory distress. If cough or difficulty breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonitis. Administer oxygen and assist ventilation as required. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. In case of seizures, administer a benzodiazepine IV. Irrigate exposed eyes with copious amounts of room temperature water for at least 15 minutes in case of eye exposure. Following dermal exposure, remove contaminated clothing and wash exposed area thoroughly with soap and water. Treat dermal irritation or burns with standard topical therapy. Patients developing dermal hypersensitivity reactions may require treatment with systemic or topical corticosteroids or antihistamines. (T36)

Interactions:

>> Inhalation studies were conducted to determine the potential subchronic toxicity of a mixture of trans-1,2-dichloroethylene (70%), cis-1,2-dichloroethylene (5%), and perfluorobutylethylene (25%). Groups of rats were exposed to 0, 400, 2000, or 8000 ppm concentrations of the mixture vapor 6 hr/day, 5 days/wk, for a total of 20 exposures. Subgroups of rats were further observed during a 1-month recovery period. Functional observational battery (FOB) and motor activity (MA) behavioral tests were conducted prior to initiation of the exposures, during exposure wk 4, and after a 1-month post-exposure recovery period. Clinical pathology evaluations were conducted at the end of the exposure period and after a 1-month recovery period. At the end of the 4-wk exposure period, tissues from rats were collected, histologically processed, and evaluated by light microscopy. Test substance-related, biologically significant decreased body weights and body weight gains occurred in male and female rats exposed to 8000 ppm. In addition, test substance-related, statistically significant decreases in food consumption and/or food efficiency were observed in male rats exposed to 8000 ppm. During exposures to 8000 ppm, some rats exhibited tremors and ataxia. Usually tremors and ataxia were observed within 1 hr after initiation of the daily exposure period and were observed during each exposure day. Tremors were also observed during 1 exposure day in the 2000 ppm animals. In addition to the tremors and ataxia, rats exposed to 2000 ppm or 8000 ppm had a diminished and/or no alerting response to a sharp, sound stimulus during each of the daily exposure periods. These effects were transient since no clinical observations of compromised neurological function were detected when the rats were evaluated upon return to the animal room following exposure. Daily reoccurrence of this apparently acute effect in the 8000 ppm group did not produce enduring neurological changes since there were no test substance-related effects on FOB parameters or on MA conducted the day following the last exposure or during the recovery period. In addition, there were no toxicologically significant changes in hematology, clinical chemistry, or urinalysis parameters in either males or females for any exposure concentration; and there were no test substance-related gross or microscopic morphological changes in males or females administered any exposure concentration. Under the conditions of the study, the no-observed-effect level (NOEL) was 400 ppm in males and females based on clinical signs of toxicity during exposure to 2000 or 8000 ppm. /Mixture of trans-1,2-dichloroethylene (70%), cis-1,2-dichloroethylene (5%), and perfluorobutylethylene (25%)/

Antidote and Emergency Treatment:

>> If this chemical gets into the eyes, remove any contact lenses at once and irrigate immediately for at least 15 min, occasionally lifting upper and lower lids. Seek medical attention immediately. If this chemical contacts the skin, remove contaminated clothing and wash immediately with soap and water. Seek medical attention immediately. If this chemical has been inhaled, remove from exposure, begin rescue breathing (using universal precautions, including resuscitation mask) if breathing has stopped and CPR if heart action has stopped. Transfer promptly to a medical facility. When this chemical has been swallowed, get medical attention. ...

Human Toxicity Excerpts:

>> /SIGNS AND SYMPTOMS/ Clinical effects caused by acute exposure to 1,2-dichloroethene include central nervous system and respiratory depression, eye and upper respiratory irritation, nausea, vomiting, weakness, tremors, and epigastric cramps, all of which may resolve rapidly after the exposure ceases.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ Some but not all dogs /experienced CNS depression/ by inhaling the vapor have been observed to develop delicate superficial corneal turbidity. The first observation of corneal disturbance was made on three dogs repeatedly exposed to dichloroethylene by evaporation of 10-15 cc in a chamber of 0.115 cu m volume. Haziness was observed in both corneas of one dog after the second exposure and slight haziness of one eye of another dog after fourteen exposures, but no ocular disturbance was found in the third dog. A more detailed study

subsequently showed that the corneal haziness occuring in dogs was attributable to many fine gray flecks in the endothelium, and that this usually cleared in twenty-four hours, or forty-eight hours at the most.

Non-Human Toxicity Values:

>> LD50 Mouse ip approximately 2150 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.

>> 1,2-Dichloroethylene exists in two isomeric states: trans-1,2-dichloroethylene and cis-1,2-dichloroethylene. The trans isomer is used more widely in industry than the cis isomer. trans-1,2-Dichloroethylene is used as a solvent for waxes, resins, and acetylcellulose. It is also used in the extraction of rubber, as a refrigerant, and in the manufacture of pharmaceuticals and artificial pearls. F344/N rats and B6C3F1 mice were administered trans- 1,2-dichloroethylene in microcapsules in feed for 14 weeks. Animals were evaluated for clinical pathology, reproductive system effects, and histopathology. Genetic toxicity studies were conducted in vitro in Salmonella typhimurium and Chinese hamster ovary (CHO) cells, and in vivo in mouse bone marrow cells and peripheral blood erythrocytes. In the 14-week feed studies, groups of 10 male and 10 female rats and mice were fed diets containing microcapsules with a chemical load of 45% trans-1,2-dichloroethylene. Dietary concentrations of 3,125, 6,250, 12,500, 25,000, and 50,000 ppm microencapsulated trans-1,2-dichloroethylene resulted in average daily doses of 190, 380, 770, 1,540, and 3,210 mg/kg for male rats; 190, 395, 780, 1,580, and 3,245 mg/kg for female rats; 480, 920, 1,900, 3,850, and 8,065 mg/kg for male mice; and 450, 915, 1,830, 3,760, and 7,925 mg/kg for female mice. Additional groups of 10 male and 10 female rats and mice served as untreated and vehicle controls. There were no exposure- related deaths of rats or mice. Mean body weights of male rats and male and female mice in the 50,000 ppm groups were significantly less than those of the vehicle controls. The mean body weight gains of female mice in the 12,500 and 25,000 ppm groups were also significantly less than that of the vehicle controls. On day 21 and at week 14, there were mild decreases in hematocrit values, hemoglobin concentrations, and erythrocyte counts in groups of male and female rats in the 25,000 and 50,000 ppm groups. At week 14, these effects were seen in male rats exposed to 6,250 and 12,500 ppm. There were no exposure-related alterations in clinical chemistry parameters in rats or mice. The liver weights of female rats exposed to 6,250 ppm or greater were significantly greater than those of the vehicle controls. The absolute kidney weights of male rats exposed to 25,000 or 50,000 ppm were significantly decreased. No gross or microscopic lesions were observed in rats or mice that could be attributed to trans-1,2-dichloroethylene exposure. Neither cis-, trans-, nor cis,trans-1,2-dichloroethylene was mutagenic in S. typhimurium strain TA97 (cis isomer only), TA98, TA100, TA1535, or TA1537, with or without S9 metabolic activation enzymes. In CHO cells in vitro, cis-1,2-dichloroethylene induced sister chromatid exchanges (SCEs) in the absence of S9; with S9, the single trial that was performed yielded equivocal results. The cis,trans isomer induced significant increases in SCEs in cultured CHO cells with and without S9. In contrast to these positive results, trans-1,2-dichloroethylene gave negative results in the SCE test, with and without S9. Neither cis-, trans-, nor cis,trans-1,2-dichloroethylene induced chromosomal aberrations (Abs) in cultured CHO cells, with or without S9. In vivo, no induction of SCEs or Abs was noted in bone marrow cells of male mice administered cis- or trans-1,2-dichloroethylene by intraperitoneal injection once, with sampling performed 23 hours (for SCE analyses) or 17 hours (for Abs analyses) after injection. In addition, negative results were obtained in a peripheral blood micronucleus test in male and female mice administered trans- 1,2-dichloroethylene in microcapsules in feed for 14 weeks. Very little toxicity was associated with ingestion of microencapsulated trans-1-2-dichloroethylene. Histopathology and clinical chemistry data, combined with body and organ weight data, revealed that the maximum tolerated dose was not reached in these studies.

Populations at Special Risk:

>> While no populations with unusual susceptibility to the health effects of 1,2-dichloroethene could be identified, based on the available literature, certain diabetics may be unusually susceptible because of impairment of glucose metabolism and increased production of acetone. In addition, individuals with impaired livers, such as alcoholics, and those with exposure to other halogenated hydrocarbons may be unusually susceptible to 1,2-dichloroethene exposure.

12. Ecological Information

Resident Soil (mg/kg)

>> 7.00e+01

Industrial Soil (mg/kg)

>> 3.00e+02

Resident Air (ug/m3)

>> 4.20e+01

Industrial Air (ug/m3)

>> 1.80e+02

Tapwater (ug/L)

>> 6.80e+01

MCL (ug/L)

>> 1.00e+02

Risk-based SSL (mg/kg)

>> 2.10e-02

MCL-based SSL (mg/kg)

>> 3.10e-02

Chronic Oral Reference Dose (mg/kg-day)

>> 2.00e-02

Chronic Inhalation Reference Concentration (mg/m3)

>> 4.00e-02

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Soil Saturation Concentration (mg/kg)

>> 1.85e+03

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SEDIMENT: Of the 361 stations in the USEPA STORET data base 4% had detectable quantities of 1,2-dichloroethylene in sediment with a median concentration of <5 ppb(1). Surficial sediment taken 6 km northwest of the discharge from the Los Angeles County, CA wastewater treatment plant at a depth of 60 m contained <0.5 ppb (dry weight) of 1,2-dichloroethylene(2). 1,2-Dichloroethylene was detected, not quantified, in sediment/soil/water samples at the Love Canal, Niagara Falls, NY(3). SOIL: 1,2-Dichloroethylene was detected at one of nine locations in a soil cover at different depths from a landfill in Florence, Italy, at 11,458-18,547 ppbv(4).

Fish/Seafood Concentrations:

Concentrations of this compound in fish or seafood.

>> Samples of fish livers, shrimp muscle and invertebrates collected 6 km northwest of the discharge from the Los Angeles County, CA wastewater treatment plant contained <0.3 ppb (wet weight) of 1,2-dichloroethylene(1). None of the 95 stations in the USEPA STORET data base reported detectable quantities of 1,2-dichloroethylene in fish(2).

13. Disposal Considerations

Spillage Disposal

>> Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Remove all ignition sources. Do NOT wash away into sewer. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in dry 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 U079, must conform with USEPA regulations in storage, transportation, treatment and disposal of waste.

>> Product: Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a

licensed professional waste disposal service to dispose of this material; 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.

>> A potential candidate for rotary kiln incineration at a temperature range of 820 to 1,600 °C and residence times of seconds for liquids and gases, and hours for solids. Also, a potential candidate for fluidized bed incineration at a temperature range of 450 to 980 °C and residence times of seconds for liquids and gases, and longer for solids. Also a potential candidate for liquid injection incineration at a temperature range of 650 to 1,600 °C and a residence time of 0.1 to 2 seconds. /Trans-1,2-Dichloroethylene/

>> For more Disposal Methods (Complete) data for 1,2-Dichloroethylene (7 total), please visit the HSDB record page.

>> Generators of waste (equal to or greater than 100 kg/mo) containing this contaminant, EPA hazardous waste number U079, must conform with USEPA regulations in storage, transportation, treatment and disposal of waste.

>> 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.

>> Product: Offer surplus and non-recyclable solutions to a licensed disposal company. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Contact a licensed professional waste disposal service to dispose of this material; Contaminated packaging: Dispose of as unused product.

>> A potential candidate for rotary kiln incineration at a temperature range of 820 to 1,600 °C and residence times of seconds for liquids and gases, and hours for solids; Also, a potential candidate for fluidized bed incineration at a temperature range of 450 to 980 °C and residence times of seconds for liquids and gases, and longer for solids; Also a potential candidate for liquid injection incineration at a temperature range of 650 to 1,600 °C and a residence time of 0.1 to 2 seconds.

>> For more Disposal Methods (Complete) data for trans-1,2-Dichloroethylene (6 total), please visit the HSDB record page.

14. Transport Information

DOT

1,2-Dichloroethylene
3
UN Pack Group: II
Reportable Quantity of 1000 lb or 454 kg

IATA

1,2-Dichloroethylene
3,
UN Pack Group: II

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 organic contaminants apply to community and non-transient, non-community water systems: trans-1,2-Dichloroethylene, MCL 0.1 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.

>> Maximum contaminant level goals for organic contaminants: trans-1,2-Dichloroethylene, MCLG: 0.1 mg/L.

State Drinking Water Standards:

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

>> (FL) FLORIDA 70 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.

>> Toxic pollutant designated pursuant to section 307(a)(1) of the Federal Water Pollution Control Act and is subject to effluent limitations.

TSCA Requirements:

This section provides information on requirements concerning this chemical under the Toxic Substances Control Act (TSCA) of 1976. TSCA provides EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics and pesticides.

>> Section 8(a) of TSCA requires manufacturers of this chemical substance to report preliminary assessment information concerned with production, exposure, and use to EPA as cited in the preamble in 51 FR 41329. Effective date: 3/11/94; Reporting date: 5/10/94.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Ethene, 1,2-dichloro-, (E)-

REACH Registered Substance

>> Status: Active Update: 12-01-2022 https://echa.europa.eu/registration-dossier/-/registered-dossier/16486

New Zealand EPA Inventory of Chemical Status

>> Ethene, 1,2-dichloro-, (1E)-: HSNO Approval: HSR001122 Approved with controls

New Zealand EPA Inventory of Chemical Status

>> 1,2-Dichloroethylene: Does not have an individual approval but may be used as a component in a product covered by a group standard. It is not approved for use as a chemical in its own right.

16. Other Information

Toxic Combustion Products:

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

>> Combustion by-products may include hydrogen chloride, phosgene.

Other Safety Information

Chemical Assessment

>> IMAP assessments - Ethene, 1,2-dichloro-, (E)-: Human health tier I 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."