SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : Methyl tert-butyl ether
Catalog Number : io-2683
CAS Number : 1634-04-4
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

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

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

Precautionary Statement Codes

>> P210, P233, P240, P241, P242, P243, P264, P280, P302+P352, P303+P361+P353, P321, P332+P317, P362+P364, P370+P378, P403+P235, and P501

Health Hazards:

>> INHALATION: May cause dizziness or suffocation. Contact may irritate or burn eyes or skin. May be harmful if swallowed. (USCG, 1999)

ERG 2024, Guide 127 (Methyl tert-butyl ether)

>> Inhalation or contact with material may irritate or burn skin and eyes.

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

>> Vapors may cause dizziness or asphyxiation, especially when in closed or confined areas.

>> Runoff from fire control or dilution water may cause environmental contamination.

>> Special Hazards of Combustion Products: May contain irritating and toxic gases.

>> Behavior in Fire: May be ignited by heat, sparks or flames. Containers may explode in heat of fire. Vapor explosion hazard indoors, outdoors, or in sewers. (USCG, 1999)

ERG 2024, Guide 127 (Methyl tert-butyl ether)

>> HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.

>> CAUTION: Ethanol (UN1170) can burn with an invisible flame. Use an alternate method of detection (thermal camera, broom handle, etc.)

>> Vapors may form explosive mixtures with air.

>> Vapors may travel to source of ignition and flash back.

>> Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks, etc.).

>> Vapor explosion hazard indoors, outdoors or in sewers.

>> Those substances designated with a (P) may polymerize explosively when heated or involved in a fire.

>> Runoff to sewer may create fire or explosion hazard.

>> Containers may explode when heated.

>> Many liquids will float on water.

>> Highly flammable. Vapour/air mixtures are explosive.

3. Composition/Information On Ingredients

Chemical name : Methyl tert-butyl ether
CAS Number : 1634-04-4
Molecular Formula : C5H12O
Molecular Weight : 88.1500 g/mol

4. First Aid Measures

First Aid:

>> INHALATION: Move victim to fresh air; call emergency medical care. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

>> EYES OR SKIN: Flush with running water for at least 15 minutes; hold eyelids open if necessary. Remove and isolate contaminated clothing and shoes at the site. Keep victim quiet and maintain normal body temperature.

>> INGESTION: If victim is unconscious or having convulsions, do nothing except keep victim warm. (USCG, 1999)

ERG 2024, Guide 127 (Methyl tert-butyl ether)

>> 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:

>> Wash skin with soap and water.

>> In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.

>> 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. Artificial respiration may be needed. Refer for medical attention.

Skin First Aid

>> Remove contaminated clothes. Rinse and then wash skin with water and soap.

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 a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Refer for medical attention .

5. Fire Fighting Measures

>> Hazardous decomposition products formed under fire conditions - Carbon oxides

>> Excerpt from ERG Guide 127 [Flammable Liquids (Water-Miscible)]:

>> CAUTION: The majority of these products have a very low flash point. Use of water spray when fighting fire may be inefficient. CAUTION: For fire involving UN1170, UN1987 or UN3475, alcohol-resistant foam should be used. CAUTION: Ethanol (UN1170) can burn with an invisible flame. Use an alternate method of detection (thermal camera, broom handle, etc.).

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

>> LARGE FIRE: Water spray, fog or alcohol-resistant foam. Avoid aiming straight or solid streams directly onto the product. If it can be done safely, move undamaged containers away from the area around the fire.

>> FIRE INVOLVING TANKS, RAIL TANK CARS OR HIGHWAY TANKS: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. 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. For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn. (ERG, 2024)

>> Use powder, AFFF, 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 127 [Flammable Liquids (Water-Miscible)]:

>> 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)

Evacuation: ERG 2024, Guide 127 (Methyl tert-butyl ether)

>> 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.

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. Remove all ignition sources. 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. Do NOT wash away into sewer.

Accidental Release Measures

Public Safety: ERG 2024, Guide 127 (Methyl tert-butyl ether)

>> 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 127 (Methyl tert-butyl ether)

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

>> All equipment used when handling the product must be grounded.

>> Do not touch or walk through spilled material.

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

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

>> A vapor-suppressing foam may be used to reduce vapors.

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

>> Use clean, non-sparking tools to collect absorbed material.

>> Large Spill

>> Dike far ahead of liquid spill for later disposal.

>> Water spray may reduce vapor, but may not prevent ignition in closed spaces.

7. Handling And Storage

Safe Storage:

>> Fireproof. Separated from strong oxidants and strong acids.

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. Storage class (TRGS 510): Flammable liquids

8. Exposure Control/ Personal Protection

>> 50.0 [ppm]

>> 50 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans).

TLV-TWA (Time Weighted Average)

>> 50 ppm [1999]

EU-OEL

>> 183.5 mg/m

MAK (Maximale Arbeitsplatz Konzentration)

>> 180 mg/m

Emergency Response: ERG 2024, Guide 127 (Methyl tert-butyl ether)

>> CAUTION: The majority of these products have a very low flash point. Use of water spray when fighting fire may be inefficient.

>> CAUTION: For fire involving UN1170, UN1987 or UN3475, alcohol-resistant foam should be used.

>> CAUTION: Ethanol (UN1170) can burn with an invisible flame. Use an alternate method of detection (thermal camera, broom handle, etc.)

>> Small Fire

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

>> Large Fire

>> Water spray, fog or alcohol-resistant foam.

>> Avoid aiming straight or solid streams directly onto the product.

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

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

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

>> 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.

>> For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

>> ERPG-1: 5 ppm - one hour exposure limit: 1 = mild transient health effects or objectionable odor [AIHA]

>> ERPG-2: 1,000 ppm - one hour exposure limit: 2 = impaired ability to take protective action [AIHA]

>> ERPG-3: 5,000 ppm - one hour exposure limit: 3 = life threatening health effects [AIHA]

Inhalation Risk:

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

Effects of Short Term Exposure:

>> The substance is irritating to the skin. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure far above the OEL could cause lowering of consciousness.

Fire Prevention

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

Inhalation Prevention

>> Use ventilation, local exhaust or breathing protection.

Skin Prevention

>> Protective gloves.

Eye Prevention

>> Wear safety goggles or face shield.

Ingestion Prevention

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

Exposure Control and Personal Protection

Protective Clothing: ERG 2024, Guide 127 (Methyl tert-butyl ether)

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

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

Maximum Allowable Concentration (MAK)

>> 50.0 [ppm]

9. Physical And Chemical Properties

Molecular Weight:

>> 88.15

Exact Mass:

>> 88.088815002

Physical Description:

>> Methyl tert-butyl ether appears as a colorless liquid with a distinctive anesthetic-like odor. Vapors are heavier than air and narcotic (cause drowsiness when inhaled). This liquid has a flash point lower than most ambient temperatures, so it will readily ignite under most conditions. It is less dense than water and moderately soluble in water. Used as a octane booster in gasoline.

>> COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Color/Form:

>> Liquid

Odor:

>> Terpene-like odor

Boiling Point:

>> 131.4 °F at 760 mmHg (USCG, 1999)

>> 55 °C

Melting Point:

>> -164.2 °F (USCG, 1999)

>> -109 °C

Flash Point:

>> -14 °F (USCG, 1999)

>> -28 °C c.c.

Solubility:

>> Solubility of water in methyl t-butyl ether: 1.5 g/100 g; unstable in acid solution

>> Solubility in water, g/100ml at 20 °C: 4.2

Density:

>> 0.7405 at 68 °F (USCG, 1999) - Less dense than water; will float

>> Relative density (water = 1): 0.7

Vapor Density:

>> Relative vapor density (air = 1): 3.0

Vapor Pressure:

>> 250.0 [mmHg]

>> Vapor pressure, kPa at 20 °C: 27

LogP:

>> log Kow = 0.94

>> 1.06

Stability/Shelf Life:

>> Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and

good laboratory practices. Wash and dry hands.

Autoignition Temperature:

>> 435 °C

>> 375 °C

Decomposition:

>> When heated to decomposition it emits acrid smoke and irritating fumes.

Heat of Combustion:

>> 101,000 btu/gal at 25 °C (804 kcal/mole)

Heat of Vaporization:

>> 145 btu/lb at 55 °C (7 kcal/mole)

Odor Threshold:

>> Odor Threshold Low: 0.05 [mmHg]

>> Odor Threshold High: 0.13 [mmHg]

>> Odor thresholds from CHEMINFO

Refractive Index:

>> Index of refraction = 1.3664 at 25 °C/D

Dissociation Constants:

>> pKa = -3.70

10. Stability And Reactivity

>> Highly flammable. Oxidizes readily in air to form unstable peroxides that may explode spontaneously [Bretherick 1979. p.151-154, 164]. A mixture of liquid air and diethyl ether exploded spontaneously [MCA Case History 616. 1960].

CSL No

>> CSL00040

Reactants/Reagents

>> BROMINE + TERT-BUTYL METHYL ETHER

Warning Message

>> Spontaneous exothermic reaction when mixed in 1:1 molar ratio

GHS Category

>> Explosive

Reaction Class

>> Bromination

Reference Source

>> User-Reported

Modified Date

>> 5/31/18

Create Date

>> 4/20/17

Peroxide Forming Chemical:

Peroxide-forming chemicals (PFCs) are chemicals that can "auto-oxidize" with atmospheric oxygen under ambient conditions to form organic peroxides (contains an -O-O- bond). Peroxide formation can be initiated by exposure to air, self-polymerization, or solvent impurities. Once formed, organic peroxides are sensitive to thermal or mechanical shock and can be violently explosive in concentrated solutions or as solids.

Chemical

>> t-Butyl methyl ether

Class (* = UMN Designation)

>> D: Other compounds that may form peroxides

Peroxide Concentration Over Time

>> 9 ppm after 663 h

>> hardly and PO generated after 30 days

Reference(s)

>> Kelly

Additional Reference(s)

>> https://doi.org/10.1021/ja01614a066

>> Hage, T., Chem. Abs., 1987, 107, 21833

>> Pearson, H., Chem. Abs., 1988, 108, 115254

>> https://cameochemicals.noaa.gov/chemical/7091

>> https://doi.org/10.1039/B900229B

11. Toxicological Information

Toxicity Summary:

>> IDENTIFICATION AND USE: Methyl tertiary-Butyl Ether (MTBE) is a colorless liquid. It is used as octane booster for unleaded gasoline (up to 7% by volume). HUMAN STUDIES: Humans exposed to motor fuel containing MTBE have experienced increase frequency of respiratory, allergic, and neurologic reactions. Symptoms in humans also include headaches; nausea; vomiting; burning sensation in the nose, mouth, or throat; cough; dizziness; nosebleeds; eye irritation; spaciness and disorientation; breathing problems; fatigue; inability to concentrate; shortness of breath; anxiety; depression; stomach cramps; poor memory; insomnia; and loss of appetite. Aspiration into the lungs may result in chemical pneumonitis. MTBE induced DNA double-strand breaks at 200 uM in human lymphocytes. ANIMAL STUDIES: In studies on animals, MTBE is moderately acutely toxic and induces mild skin and eye irritation but not sensitization. Repeated exposure in rodents affects primarily the kidney and the liver. Exposure to MTBE results in reversible central nervous system (CNS) effects including sedation, hypoactivity, ataxia and anesthesia at higher concentrations and biphasic effects on motor activity at lower concentrations. Inhalation exposure to MTBE produced increased incidences of kidney and testicular tumors in male rats and liver tumors in mice. Oral administration of MTBE produced increased incidences of leukemias and lymphomas (combined) in female rats and testicular tumors in male rats (see the table). MTBE has not induced adverse reproductive or developmental effects in rodents at concentrations less than those that were toxic to the parent. In zebrafish embryos MTBE disrupted angiogenesis. MTBE was not genotoxic in Salmonella assay and the mouse bone marrow micronucleus test. However, statistically significant increases in sister chromatid exchange were observed in female rats given MTBE. ECOTOXICITY STUDIES: Chronic exposure over three weeks to effective MTBE concentrations as low as 0.11 mg/L induced a significant increase in the vitellogenin concentration of male zebrafish (Danio rerio). In African catfish Clarias gariepinus developmental exposure to MTBE resulted in deformed eyes, mouthparts, and spinal cord and in increased larval mortality. MTBE is toxic to various aquatic organisms at concentrations of 57 to 1000 mg/L (invertebrates), and 388-2600 mg/L (vertebrates). MTBE was toxic to earthworm species. Lettuce was most sensitive to MTBE, followed (in order of decreasing sensitivity) by wild oats, wheat, and sweet corn.

>> Table: Summary Results of MTBE Cancer Bioassays [Table#5574]

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

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

Chemical

>> Methyl tert-butyl ether

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).

>> CASRN 1634-04-4 Status: Reviewed but not listed in the Report on Carcinogens (RoC)

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

>> Methyl tert-butyl ether

IARC Carcinogenic Classes

>> Group 3: Not classifiable as to its carcinogenicity to humans

IARC Monographs

>> Volume 73: (1999) Some Chemicals that Cause Tumours of the Kidney or Urinary Bladder in Rodents and Some Other Substances

Exposure Routes:

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

Inhalation Exposure

>> Drowsiness. Dizziness. Headache. Weakness. Unconsciousness.

Skin Exposure

>> Dry skin. Redness.

Eye Exposure

>> Redness.

Ingestion Exposure

>> Abdominal pain. Nausea. Vomiting. Further see Inhalation.

Target Organs:

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

>> Gastrointestinal (Stomach and Intestines, part of the digestive system), Hepatic (Liver), Neurological (Nervous System), Renal (Urinary System or Kidneys), Respiratory (From the Nose to the Lungs)

>> Hepatic

>> Ocular

>> Urinary

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.

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

>> ACGIH Carcinogen - Confirmed Animal.

Toxicity Data:

>> LC50 (rat) = 23,576 ppm/4h

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-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting 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. /Esters and related compounds/

Human Toxicity Excerpts:

>> /SIGNS AND SYMPTOMS/ Inhalation: drowsiness, dizziness, headache, weakness, unconciousness. Skin: dry skin, redness. Eyes: redness. Ingestion: abdominal pain, nausea, vomiting.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Subchronic or Prechronic Exposure/ Nine-week-old male Sprague-Dawley rats were gavaged with 250, 500, 1000, or 1500 mg methyl tert-butyl ether (MTBE)/kg/day in corn oil or corn oil alone for 15 or 28 consecutive days. Increased relative liver weight (10-14%) and minimal-to-moderate centrilobular hypertrophy were observed in rats treated with 1000 and 1500 mg MTBE/kg/day (high doses) for 28 days. Total hepatic microsomal cytochrome P450 (CYP) was increased 1. 3-fold in the high-dose, 15-day-treated rats. An evaluation of specific CYP activities using selective markers demonstrated a 2.0-fold increase in CYP2B1/2 in rats treated with 1000 mg MTBE/kg/day for 28 days, and with 1500 mg MTBE/kg/day for 15 and 28 days (6.5- and 2.9-fold, respectively). CYP1A1/2, CYP2A1, and CYP2E1 activities were increased 1.5-, 2.4-, and 2.3-fold, respectively, in high-dose, 15-day-treated rats. CYP2E1 was also increased in high-dose, 28-day-treated rats (2.0-fold). CYP3A1/2 was increased 2.1-fold and UDP-glucuronosyltransferase activity 1.7-fold in high-dose, 28-day-treated rats. MTBE also induced its own metabolism 2.1-fold in high-dose, 28-day-treated rats. ...

Non-Human Toxicity Values:

>> LD50 Rat oral 4 g/kg (4,000 mg/kg)

TSCA Test Submissions:

Under the Toxic Substances Control Act (TSCA), EPA has broad authority to issue regulations designed to require manufacturers (including importers) or processors to test chemical substances and mixtures for health and environmental effects. This section provides information on test reports submitted for this chemical under TSCA.

>> In a single generation reproduction study, male CD rats (15/group) were exposed by inhalation to methyl t-butyl ether (MBE) at nominal concentrations of 0, 250, 1000 or 2500 ppm for 6 hrs/day, 5 days/week for a 12 week pre-mating and post-mating periods. Female CD rats (30/group) were exposed in the same manner for a three-week pre-mating period. The rats were exposed to MBE for 6 hrs/day during mating and exposure of the females continued (6 hrs/day, daily) through gestation days (GD) 0-20 and lactation days 5-21, and for 6 hrs/day during a two-week rest interval before a second mating period, during which the rats were again treated daily. Significant differences were observed between treated and control animals in the following: decreased first litter pup survival (low- and mid-dose groups, Day 0-4), increased second litter pup survival (mid- and high-dose groups, Day 0-7), increased incidence of dilated renal pelves (low- and high dose group F0 females), and increased incidence of alopecia (high-dose group F0 females). No significant differences were observed between treated and control animals in the following: parental mortality, body weights, mating indices, male fertility indices, pregnancy rates, reproduction indices (gestation length, litter size, litter survival indices), weights of gonads and organs of the male reproductive tract, pup body weights, first litter interval high-dose group pup survival and mid- and low-dose pup survival data for Days 7-21, second litter interval low-dose group pup survival and mid- and high-dose pup survival data for Days 7-21, pup sex ratios, gross examination of pups and dead pups, weights of F0 rat organs, including ovaries (females), testes, epididymides, seminal vesicles and prostate, and histological evaluation of the gonads.

12. Ecological Information

Resident Soil (mg/kg)

>> 4.70e+01

Industrial Soil (mg/kg)

>> 2.10e+02

Resident Air (ug/m3)

>> 1.10e+01

Industrial Air (ug/m3)

>> 4.70e+01

Tapwater (ug/L)

>> 1.40e+01

MCL (ug/L)

>> 4.00e+01

Risk-based SSL (mg/kg)

>> 3.20e-03

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

>> 1.80e-03

Inhalation Unit Risk (ug/m3)-1

>> 2.6e-07

Chronic Inhalation Reference Concentration (mg/m3)

>> 3.00e+00

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Soil Saturation Concentration (mg/kg)

>> 8.87e+03

ICSC Environmental Data:

>> It is strongly advised not to let the chemical enter into the environment because it is persistent.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SOIL: Methyl t-butyl ether exhibited a 4.2% frequency of detection in 720 soil samples from 30 industrial sites in Taiwan(1).

Average Daily Intake:

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

>> AIR INTAKE: Arithmetic mean occupational doses via air were in the range of 0.1 to 1.0 mg/kg-day, while doses from residential exposures, commuting, and refueling were in the range of 0.0004 to 0.006 mg/kg-day(1). WATER INTAKE: The estimated arithmetic mean dose for the population exposed via water was 1.4X10-3 mg/kg-day(1).

13. Disposal Considerations

Spillage Disposal

>> Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Remove all ignition sources. 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. Do NOT wash away into sewer.

Disposal Methods

>> SRP: Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in air, soil or water; effects on animal, aquatic and plant life; and conformance with environmental and public health regulations. If it is possible or reasonable use an alternative chemical product with less inherent propensity for occupational harm/injury/toxicity or environmental contamination.

>> 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.

14. Transport Information

DOT

Methyl tert-butyl ether
3

UN Pack Group: II
Reportable Quantity of 1000 lb or 454 kg

IATA

Methyl tert-butyl ether
3,
UN Pack Group: II

15. Regulatory Information

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.

>> EPA 20-40 ug/L

State Drinking Water Standards:

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

>> (CA) CALIFORNIA 13 ug/L /Secondary enforceable standard/

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.

>> Pursuant to section 8(d) of TSCA, EPA promulgated a model Health and Safety Data Reporting Rule. The section 8(d) model rule requires manufacturers, importers, and processors of listed chemical substances and mixtures to submit to EPA copies and lists of unpublished health and safety studies. Propane, 2-methoxy-2-methyl- is included on this list. Effective date: 12/15/86; Sunset date: 12/15/96.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Propane, 2-methoxy-2-methyl-

REACH Registered Substance

>> Status: Active Update: 18-04-2023 https://echa.europa.eu/registration-dossier/-/registered-dossier/15543

New Zealand EPA Inventory of Chemical Status

>> Methyl t-butyl ether: Does not have an individual approval but may be used under an appropriate group standard

16. Other Information

Other Safety Information

Chemical Assessment

>> IMAP assessments - Propane, 2-methoxy-2-methyl-: Human health tier II assessment

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