SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : Methyl vinyl ketone
Catalog Number : io-2686
CAS Number : 78-94-4
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 (99.3%): Highly Flammable liquid and vapor [Danger Flammable liquids]

>> H300 (100%): Fatal if swallowed [Danger Acute toxicity, oral]

>> H310 (45.1%): Fatal in contact with skin [Danger Acute toxicity, dermal]

>> H314 (97.4%): Causes severe skin burns and eye damage [Danger Skin corrosion/irritation]

>> H317 (44.4%): May cause an allergic skin reaction [Warning Sensitization, Skin]

>> H318 (28.1%): Causes serious eye damage [Danger Serious eye damage/eye irritation]

>> H330 (97.4%): Fatal if inhaled [Danger Acute toxicity, inhalation]

>> H400 (45.1%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]

>> H410 (45.1%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P210, P233, P240, P241, P242, P243, P260, P261, P262, P264, P264+P265, P270, P271, P272, P273, P280, P284, P301+P316, P301+P330+P331, P302+P352, P302+P361+P354, P303+P361+P353, P304+P340, P305+P354+P338, P316, P317, P320, P321, P330, P333+P317, P361+P364, P362+P364, P363, P370+P378, P391, P403+P233, P403+P235, P405, and P501

NFPA 704 Diamond

NFPA Health Rating

>> 4 - Materials that, under emergency conditions, can be lethal.

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.

Highly Hazardous Substance:

This section provides information on this chemical as a highly hazardous substance (due to potential safety and hazards issues from its high toxicity and/or reactivity). The information in this section is from two sources: (1) Annex XVII to REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) from the European Chemicals Agency (ECHA), (2) ECHA's Candidate List of Substances of Very High Concern (SVHC) for Authorisation and (3) the List of Highly Hazardous Chemicals, Toxics and Reactives (29 CFR 1910.119 Appendix A).

OSHA Highly Hazardous Chemicals, Toxics and Reactives

>> Chemical: Methyl Vinyl Ketone

>> Threshold: 100 [lb]

>> Note: Methyl Vinyl Ketone in quantities at or above above 100lb presents a potential for a catastrophic event as a toxic or reactive highly hazardous chemical.

Health Hazards:

>> This material is readily absorbed through the skin, causing general poisoning, similar to other ketones; inhalation has central nervous system depressant effects. It is irritating to mucous membranes and respiratory tract and to the skin; it is a lachrymator and can cause eye injury. (EPA, 1998)

>> Vapors form flammable mixtures with air, and may travel a considerable distance to a source of ignition and flash back. Polymerization may take place in containers, possibly with violent rupture of containers. Upon exposure to heat or flame, it emits toxic and irritating fumes. Container may explode in heat of fire. Vapor explosion and poison hazard indoors, outdoors, or in sewers. Polymerizes on standing. Hazardous polymerization may occur. Avoid heat or sunlight. (EPA, 1998)

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

Hazards Identification

ERG Hazard Classes

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

3. Composition/Information On Ingredients

Chemical name : Methyl vinyl ketone
CAS Number : 78-94-4
Molecular Formula : C4H6O
Molecular Weight : 70.0900 g/mol

4. First Aid Measures

First Aid:

>> Warning: This material is readily absorbed through the skin, causing general poisoning similar to other ketones.

>> Signs and Symptoms of Methyl Vinyl Ketone Exposure: Acute exposure of methyl vinyl ketone to the eyes may result in lacrimation, ocular pain and irritation, and corneal damage. Tachycardia (rapid heart beat), hypothermia, metabolic acidosis, nausea, and vomiting may be noted. Skin exposure to the liquid or vapor may result in dermatitis and

paresthesia (burning or tickling sensation) of affected areas. Following inhalation, neurological effects include CNS depression, headache, dizziness, fainting, tremors, and coma.

>> Emergency Life-Support Procedures: Acute exposure to methyl vinyl ketone may require decontamination and life support for the victims. Emergency personnel should wear protective clothing appropriate to the type and degree of contamination. Air-purifying or supplied-air respiratory equipment should also be worn, as necessary. Rescue vehicles should carry supplies such as plastic sheeting and disposable plastic bags to assist in preventing spread of contamination.

>> Inhalation Exposure:

>> 1. Move victims to fresh air. Emergency personnel should avoid self-exposure to methyl vinyl ketone.

>> 2. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.

>> 3. Obtain authorization and/or further instructions from the local hospital for performance of other invasive procedures.

>> 4. Transport to a health care facility.

>> Dermal/Eye Exposure:

>> 1. Remove victims from exposure. Emergency personnel should avoid self-exposure to methyl vinyl ketone.

>> 3. Remove contaminated clothing as soon as possible.

>> 4. If eye exposure has occurred, eyes must be flushed with lukewarm water for at least 15 minutes.

>> 5. Wash exposed skin areas thoroughly with soap and water.

>> 6. Obtain authorization and/or further instructions from the local hospital for performance of other invasive procedures.

>> 7. Transport to a health care facility.

>> Ingestion Exposure:

>> 1. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.

>> 2. DO NOT induce vomiting.

>> 3. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.

>> 4. Give the victims water or milk: children up to 1 year old, 125 mL (4 oz or 1/2 cup); children 1 to 12 years old, 200 mL (6 oz or 3/4 cup); adults, 250 mL (8 oz or 1 cup). Water or milk should be given only if victims are conscious and alert.

>> 5. Transport to a health care facility. (EPA, 1998)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.

Skin First Aid

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

>> ... The inhibited monomer may ... polymerize if heated sufficiently (by exposure to fire) and lead to rupture of the containing vessel.

>> Use water to keep fire-exposed containers cool. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. Wear positive pressure breathing apparatus and special protective clothing. Isolate for 1/2 mile in all directions if tank car or truck is involved in fire.

>> Use dry chemical, alcohol foam, or carbon dioxide. Water spray may be ineffective as an extinguishing agent. Small fires: dry chemical, carbon dioxide, and foam. Large fires: fog or foam. Move container from fire area if you can do so without

risk. Dike fire control water for later disposal; do not scatter the material. Spray cooling water on containers that are exposed to flames until well after fire is out. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. (EPA, 1998)

>> Use water spray, powder, alcohol-resistant 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 131 [Flammable Liquids - Toxic; polymerization hazard]:

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

>> SPILL: See ERG Table 1 - Initial Isolation and Protective Action Distances on the UN/NA 1251 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)

Isolation

>> Small spill:

>> ISOLATE in all directions: 100 m (300 ft)

>> Large spill:

>> ISOLATE in all directions: 800 m (2500 ft)

Protection

>> Small spill:

>> PROTECT people from downwind during DAY time: 0.3 km (0.2 mi)

>> PROTECT people from downwind during NIGHT time: 0.7 km (0.5 mi)

>> Large spill:

>> PROTECT people from downwind during DAY time: 1.7 km (1.1 mi)

>> PROTECT people from downwind during NIGHT time: 2.8 km (1.8 mi)

Spillage Disposal:

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

>> Remove all ignition sources. Personal protection: chemical protection suit including self-contained breathing apparatus. 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.

7. Handling And Storage

Safe Storage:

>> Fireproof. Cool. Keep in the dark. Separated from strong reducing agents, strong oxidants and strong bases. Store only if stabilized.

Storage Conditions:

>> 3-Buten-2-one can only be stored in stabilized form at room temperature.

8. Exposure Control/ Personal Protection

TLV-Ceiling

>> 0.01 [ppm]

>> Ceiling Limit: 0.2 ppm, skin, sensitizer

>> (ceiling value): 0.01 ppm as STEL.

TLV-C (Ceiling)

>> 0.001 ppm [2018]

MAK (Maximale Arbeitsplatz Konzentration)

>> skin absorption (H); sensitization of skin (SH)

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:

>> Lachrymation. The substance is corrosive to the eyes and skin. Corrosive on ingestion. The vapour is severely irritating to the eyes and respiratory tract. Inhalation may cause lung oedema. The substance may cause effects on the central nervous system.

Effects of Long Term Exposure:

>> Repeated or prolonged contact may cause skin sensitization.

Fire Prevention

>> NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting.

Exposure Prevention

>> STRICT HYGIENE!

Inhalation Prevention

>> Use ventilation, local exhaust or breathing protection.

Skin Prevention

>> Protective gloves. Protective clothing.

Eye Prevention

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

Ingestion Prevention

>> Do not eat, drink, or smoke during work. Wash hands before eating.

Exposure Control and Personal 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:

>> 70.09

Exact Mass:

>> 70.041864811

Physical Description:

>> Methyl vinyl ketone appears as a clear colorless liquid with a pungent odor. Flash point 20 °F. May polymerize with the release of heat under exposure to heat or contamination. Less dense than water. Highly toxic by inhalation. Causes burns to skin, eyes and mucous membranes.

>> COLOURLESS-TO-YELLOW LIQUID WITH PUNGENT ODOUR.

Color/Form:

>> Colorless liquid

Odor:

>> Pungent odor

Boiling Point:

>> 179 °F at 760 mmHg (EPA, 1998)

>> 81 °C

Melting Point:

>> 20 °F (EPA, 1998)

>> -7 °C

Flash Point:

>> 20 °F (EPA, 1998)

>> -7 °C c.c.

Solubility:

>> greater than or equal to 100 mg/mL at 72 °F (NTP, 1992)

>> Solubility in water: good

Density:

>> 0.8407 to 0.8636 at 68 to 77 °F (EPA, 1998)

>> Relative density (water = 1): 0.86

Vapor Density:

>> 2.41 (EPA, 1998) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 2.4

Vapor Pressure:

>> 86 mmHg at 72 °F ; 276 mmHg at 124 °F; 661 mmHg at 167 °F (NTP, 1992)

>> Vapor pressure, kPa at 25 °C: 11

LogP:

>> 0.117 (estimated)

Stability/Shelf Life:

>> POLYMERIZES ON STANDING

Autoignition Temperature:

>> 915 °F (USCG, 1999)

>> 491 °C

Viscosity:

>> 0.807 Cp at 70 °F

Heat of Vaporization:

>> 203 BTU/lb = 113 cal/g = 4.73x10+5 J/kg

Polymerization:

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

>> ... The inhibited monomer may ... polymerize if heated sufficiently (by exposure to fire) and lead to rupture of the containing vessel.

Odor Threshold:

>> Odor Threshold Low: 0.2 [mmHg]

Refractive Index:

>> Index of refraction: 1.4086 at 20 °C/D

10. Stability And Reactivity

>> Highly flammable. Miscible with water. Unstable in the presence of heat, light and air.

>> Highly Flammable

>> Polymerizable

11. Toxicological Information

Exposure Routes:

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

Inhalation Exposure

>> Burning sensation. Cough. Sore throat. Shortness of breath. Laboured breathing. Headache. Dizziness. Tremor. Symptoms may be delayed.

Skin Exposure

>> MAY BE ABSORBED! Redness. Pain. Skin burns. Further see Inhalation.

Eye Exposure

>> Watering of the eyes. Redness. Pain. Severe deep burns.

Ingestion Exposure

>> Burning sensation. Abdominal pain. Shock or collapse. Further see Inhalation.

Adverse Effects:

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

>> 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.

>> Dermatotoxin - Skin burns.

>> Lacrimator (Lachrymator) - A substance that irritates the eyes and induces the flow of tears.

>> Skin Sensitizer - An agent that can induce an allergic reaction in the skin.

>> Toxic Pneumonitis - Inflammation of the lungs induced by inhalation of metal fumes or toxic gases and vapors.

Toxicity Data:

>> LC50 (rat) = 7 mg/m3/4hr

Interactions:

>> An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.

Antidote and Emergency Treatment:

>> Basic treatment: Establish a patent airway (oropharyngeal or nasopharyngeal airway, if needed). Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer oxygen by nonrebreather mask at 10 to 15 L/min. Monitor for pulmonary edema and treat if necessary ... . For contamination, flush eyes immediately with water. Irrigate each eye continuously with 0.9% saline (NS) during transport ... . Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal ... . /Ketones and related compounds/

Human Toxicity Excerpts:

>> /SIGNS AND SYMPTOMS/ EFFECTS OF SHORT-TERM EXPOSURE: Lacrimation ... /Methyl vinyl ketone/ is corrosive to the eyes and the skin. Corrosive on ingestion. The vapor is severely irritating to the eyes and the respiratory tract. Inhalation of the substance may cause lung edema ... The symptoms of lung edema often do not become manifest until a few hours have passed and they are aggravated by physical effort ... The substance may cause effects on the central nervous system. EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact may cause skin sensitization.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ A postmortem examination on a male albino rat administered 0.2 mL of MVK by mouth (which resulted in cardiac arrest within 24 hours) revealed petechial pulmonary hemorrhages, "spectacle eye" (erythrodacryorrhea), and marked distention of the gastrointestinal tract.[NTP; Executive Summary Methyl Vinyl Ketone

(78-94-4) (January 1992). Available from, as of November 02, 2006: http://ntp.niehs.nih.gov/index.cfm?objectid=03DB450B-B5DE-6081-1DF1947BFBD4EEF0]

Non-Human Toxicity Values:

>> LC50 Mouse inhalation 8 mg/cu m/4 hr

12. Ecological Information

Fish/Seafood Concentrations:

Concentrations of this compound in fish or seafood.

>> Methyl vinyl ketone was found in charybdis feriatus crabs at 0.1 ug/kg, 0.1 ug/kg, and 6.7 ug/kg in the leg, body and carapace, respectively(1).

13. Disposal Considerations

Spillage Disposal

>> Remove all ignition sources. Personal protection: chemical protection suit including self-contained breathing apparatus. 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

>> SRP: The most favorable course of action is to use an alternative chemical product with less inherent propensity for occupational exposure or environmental contamination. 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 soil or water; effects on animal, aquatic, and plant life; and conformance with environmental and public health regulations.

14. Transport Information

DOT

Methyl vinyl ketone
6.1
UN Pack Group: I

IATA

Methyl vinyl ketone
6.1, 3 and 8
UN Pack Group: I

15. Regulatory Information

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: 3-Buten-2-one

REACH Registered Substance

>> Status: Active Update: 20-10-2022 https://echa.europa.eu/registration-dossier/-/registered-dossier/10900

New Zealand EPA Inventory of Chemical Status

>> Methyl vinyl ketone: HSNO Approval: HSR003027 Approved with controls

16. Other Information

Toxic Combustion Products:

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

>> ... Combustion may produce irritants and toxic gases.

"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."