SAFETY DATA SHEET

Updated on 31/12/2024

1. Material Identification

Product Name : Fonofos
Catalog Number : io-2415
CAS Number : 944-22-9
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

>> H300+H310+H330 (80.9%): Fatal if swallowed, in contact with skin or if inhaled [Danger Acute toxicity, oral; acute toxicity, dermal; acute toxicity, inhalation]

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

>> H310 (100%): Fatal in contact with skin [Danger Acute toxicity, dermal]

>> H330 (93.6%): Fatal if inhaled [Danger Acute toxicity, inhalation]

>> H400 (100%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]

>> H410 (100%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P260, P262, P264, P270, P271, P273, P280, P284, P301+P316, P302+P352, P304+P340, P316, P320, P321, P330, P361+P364, P391, P403+P233, P405, and P501

Health Hazards:

>> This material is a cholinesterase inhibitor. It can cause severe symptoms and death from respiratory arrest. (EPA, 1998)

>> When this material is heated to decomposition, it can emit highly toxic fumes of phosphorus oxides. (EPA, 1998)

>> Combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.

3. Composition/Information On Ingredients

Chemical name : Fonofos
CAS Number : 944-22-9
Molecular Formula : C10H15OPS2
Molecular Weight : 246.3000 g/mol

4. First Aid Measures

First Aid:

>> Warning: Effects may be delayed up to 12 hours. Caution is advised.

>> Note: Fonofos is a cholinesterase inhibitor.

>> Signs and Symptoms of Fonofos Exposure: Acute exposure to fonofos may produce the following signs and symptoms: sweating, pinpoint pupils, blurred vision, headache, dizziness, profound weakness, muscle spasms, seizures, and coma. Mental confusion and psychosis may occur. Excessive salivation, nausea, vomiting, anorexia, diarrhea, and abdominal pain may also occur. The heart rate may decrease following oral exposure or increase following dermal exposure. Chest pain may be noted. Hypotension (low blood pressure) may be observed, although hypertension (high blood pressure) is not uncommon. Respiratory symptoms include dyspnea (shortness of breath), pulmonary edema, respiratory depression, and respiratory paralysis.

>> Emergency Life-Support Procedures: Acute exposure to fonofos exposure 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 fonofos.

>> 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 administration of an antidote or performance of other invasive procedures.

>> 4. Rush to a health care facility.

>> Dermal/Eye Exposure:

>> 1. Remove victims from exposure. Emergency personnel should avoid self-exposure to fonofos.

>> 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 three times with soap and water.

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

>> 7. Rush 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. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.

>> 3. Vomiting may be induced with syrup of Ipecac. If elapsed time since ingestion of fonofos is unknown or suspected to be greater than 30 minutes, do not induce vomiting and proceed to Step

>> 4. Ipecac should not be administered to children under 6 months of age.Warning: Ingestion of fonofos may result in sudden onset of seizures or loss of consciousness. Syrup of Ipecac should be administered only if victims are alert, have an active gag-reflex, and show no signs of impending seizure or coma. If ANY uncertainty exists, proceed to Step

>> 4.The following dosages of Ipecac are recommended: children up to 1 year old, 10 mL (1/3 oz); children 1 to 12 years old, 15 mL (1/2 oz); adults, 30 mL (1 oz). Ambulate (walk) the victims and give large quantities of water. If vomiting has not

occurred after 15 minutes, Ipecac may be readministered. Continue to ambulate and give water to the victims. If vomiting has not occurred within 15 minutes after second administration of Ipecac, administer activated charcoal.

>> 4. Activated charcoal may be administered if victims are conscious and alert. Use 15 to 30 g (1/2 to 1 oz) for children, 50 to 100 g (1-3/4 to 3-1/2 oz) for adults, with 125 to 250 mL (1/2 to 1 cup) of water.

>> 5. Promote excretion by administering a saline cathartic or sorbitol to conscious and alert victims. Children require 15 to 30 g (1/2 to 1 oz) of cathartic; 50 to 100 g (1-3/4 to 3- 1/2 oz) is recommended for adults.

>> 6. Rush to a health care facility. (EPA, 1998)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest. Refer 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

>> Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Rest. Refer for medical attention .

5. Fire Fighting Measures

>> This compound is a liquid organophosphorus insecticide. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. Ventilate closed spaces before entering them. Wear positive pressure breathing apparatus and special protective clothing. Remove and isolate contaminated clothing at the site. Move container from fire area if you can do so without risk. Fight fire from maximum distance. Dike fire control water for later disposal; do not scatter the material.

>> Extinguish with dry chemical, carbon dioxide, water spray, fog, or foam. (EPA, 1998)

>> Use foam, powder, carbon dioxide.

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 152 [Substances - Toxic (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: 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. (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. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations. Do NOT wash away into sewer.

7. Handling And Storage

Safe Storage:

>> Separated from food and feedstuffs. Keep in a well-ventilated room.

Storage Conditions:

>> Separated from food and feedstuffs. Keep in a well-ventilated room.

8. Exposure Control/ Personal Protection

REL-TWA (Time Weighted Average)

>> 0.1 mg/m³

>> TWA 0.1 mg/m3 [skin]

>> none See Appendix G

>> 0.1 [mg/m3], inhalable fraction and vapor

>> 0.1 mg/m

TLV-TWA (Time Weighted Average)

>> 0.1 mg/m³ (inhalable fraction and vapor) [2005]

Inhalation Risk:

>> Evaporation at 20 °C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying.

Effects of Short Term Exposure:

>> Cholinesterase inhibition. Exposure above the OEL could cause death. The effects may be delayed. Medical observation is indicated.

Effects of Long Term Exposure:

>> Cholinesterase inhibition. Cumulative effects are possible. See Acute Hazards/Symptoms.

Exposure Prevention

>> PREVENT GENERATION OF MISTS! STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN! IN ALL CASES CONSULT A DOCTOR!

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

>> Biological Exposure Indices (BEI) [ACGIH] - Acetylcholinesterase activity in red blood cells = 70% of individual's baseline; Butylcholinesterase activity in serum or plasma = 60% of individual's baseline; Sample at end of shift; [TLVs and BEIs]

9. Physical And Chemical Properties

Molecular Weight:

>> 246.3

Exact Mass:

>> 246.03019444

Physical Description:

>> Fonofos is a light-yellow liquid with a pungent mercaptan-like odor. Used primarily as an insecticide for corn. (EPA, 1998)

>> CLEAR COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Color/Form:

>> Light yellow liquid

Odor:

>> Aromatic

Boiling Point:

>> 266 °F at 0.1 mmHg (EPA, 1998)

>> at 0.013kPa: 130 °C

Melting Point:

>> 30 °C

Flash Point:

>> greater than 201 °F (NIOSH, 2024)

>> 94 °C c.c.

Solubility:

>> 0.001 % (NIOSH, 2024)

>> Solubility in water: none

Density:

>> 1.16 at 77 °F (EPA, 1998) - Denser than water; will sink

>> Relative density (water = 1): 1.16

Vapor Pressure:

>> 0.00021 mmHg at 77 °F (EPA, 1998)

>> Vapor pressure, Pa at 25 °C: 0.03

LogP:

>> log Kow= 3.94

>> 3.94

Stability/Shelf Life:

>> Stable < 100 °C

Decomposition:

>> When heated to decomposition it emits very toxic fumes of /phosphorus oxides and sulfur oxides/.

Corrosivity:

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

>> Corrosive to steel

Refractive Index:

>> Index of refraction: 1.5883 @ 30 °C/D

10. Stability And Reactivity

>> Very slightly soluble in water.

11. Toxicological Information

RAIS Toxicity Values:

This section provides the Chemical toxicity information from the Risk Assessment Information System.

Oral Chronic Reference Dose (RfDoc) (mg/kg-day)

>> 0.002

Oral Chronic Reference Dose Reference

>> IRIS Current

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

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

Chemical

>> Fonofos

USGS Parameter Code

>> 65084

Noncancer HBSL (Health-Based Screening Level)[µg/L]

>> 10

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 E Evidence of Non-carcinogenicity for Humans

Exposure Routes:

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

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

Inhalation Exposure

>> Pupillary constriction, muscle cramp, excessive salivation. Sweating. Nausea. Dizziness. Laboured breathing. Convulsions. Unconsciousness.

Skin Exposure

>> MAY BE ABSORBED! Further see Inhalation.

Eye Exposure

>> MAY BE ABSORBED! Redness. Pain. Blurred vision.

Ingestion Exposure

>> Weakness. Abdominal cramps. Vomiting. Diarrhoea. Further see Inhalation.

>> nausea, vomiting, abdominal cramps, diarrhea, salivation; headache, dizziness, lassitude (weakness, exhaustion); rhinorrhea (discharge of thin nasal mucus), chest tightness; blurred vision, miosis; cardiac irreg; muscle fasciculation; dyspnea (breathing difficulty)

Target Organs:

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

>> Hepatic

>> Nervous

>> respiratory system, central nervous system, cardiovascular system, blood cholinesterase

Adverse Effects:

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

>> Other Poison - Organophosphate

>> ACGIH Carcinogen - Not Classifiable.

Toxicity Data:

>> LC50 (rat) = 1,900 mg/m31h

Interactions:

>> ...Pronamide has little or no effect on degradation of ...dyfonate ...in plants.

Antidote and Emergency Treatment:

>> Airway protection. Insure that a clear airway exists. Intubate the patients and aspirate the secretions with a large-bore suction device if necessary. Administer oxygen by mechanically assisted pulmonary ventilation if respiration is depressed. Improve tissue oxygenation as much as possible before administering atropine, so as to minimize the risk of ventricular fibrillation. In severe poisonings, it may be necessary to support pulmonary ventilation mechanically for several days. /Organophosphate pesticides/

Human Toxicity Excerpts:

>> /SIGNS AND SYMPTOMS/ Signs and symptoms of acute intoxication by organophosphorus insecticides include muscarinic, nicotinic, and central nervous system (CNS) manifestations. Symptoms may develop rapidly, or there may be a delay of several hours after exposure before they become evident. The delay tends to be longer in the case of more lipophilic compounds, which also require metabolic activation. Symptoms may increase in severity for more than one day and may last for several days. In severe cases, respiratory failure is a dominant effect. /Organophosphorus Pesticides/

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ Average acute oral LD50 of technical fonofos in male rats is 13.2 mg/kg... in female rats is 3 mg/kg, indicating sex-related difference in acute lethality. ...Technical fonofos... instilled into eye of albino rabbits caused death, usually during 1st 24 hr... but local eye irritation... /was/ negligible.

Non-Human Toxicity Values:

>> LD50 RAT MALE ORAL 24.5 MG/KG /(+ OR -)DYPHONATE/

12. Ecological Information

Resident Soil (mg/kg)

>> 1.30e+02

Industrial Soil (mg/kg)

>> 1.60e+03

Tapwater (ug/L)

>> 2.40e+01

MCL (ug/L)

>> 4.00e+03

Risk-based SSL (mg/kg)

>> 4.70e-02

Chronic Oral Reference Dose (mg/kg-day)

>> 2.00e-03

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Fraction of Contaminant Absorbed Dermally from Soil

>> 0.1

ICSC Environmental Data:

>> This substance may be hazardous to the environment. Special attention should be given to bees and aquatic organisms. This substance does enter the environment under normal use. Great care, however, should be taken to avoid any additional release, for example through inappropriate disposal.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SOIL: Dyphonate was detected at a range of not detected (detection limit 0.01 mg/kg) to 1.10 mg/kg in 28 farms in 6 vegetable growing areas in Southwestern Ontario in 1976(1). The median concn of dyphonate in sediment of tailwater pits from irrigated corn and sorghum fields in KS ranged 4.0-48.4 ug/kg(2). A maximum concn of 771 ug/kg was detected in the sediment of one pit(2). Dyphonate was detected at max concn of greater than 1000 ug/kg in soils in loading and rinse areas of a farm chemical supply in IA(3). 822 soil samples from 49 agrichemical facilities situated throughout Illinois were analyzed. Dyphonate was handled in 32 facilities; 5 soil samples tested positive with 4 sites testing positive with the following results: 96 ug/kg median concn, 238 ug/kg mean concn, range: 34-4,300 ug/kg, common range of detection limits - 20-60 ug/kg(4). Dyphonate was observed at concns ranging from not detected to 72 ug/kg dry wt in samples from selected Canadian agricultural soils(5).

Average Daily Intake:

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

>> The estimated total dietary intake of dyphonate in three groups of US population in 1989 were as follows: 6-11 months, less than 0.0001 ug/kg body wt/day; 14-16 yr old male: 0.0001 ug/kg body wt/day; 60-65 yr old female, less than 0.0001 ug/kg body wt/day(2). The corresponding values for 1990 were as follows: 6-11 months, 0.0001 ug/kg body wt/day; 14-16 yr old male: 0.0001 ug/kg body wt/day; 60-65 yr old female, less than 0.0001 ug/kg body wt/day(1,3).

13. Disposal Considerations

Spillage Disposal

>> Personal protection: complete protective clothing including self-contained breathing apparatus. Collect leaking liquid in sealable containers. 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

>> Hydrolysis... /of treated residues/: Alkaline hydrolysis produces methylphosphoramidoate and methyl mercaptan. Those products are less hazardous. Acid hydrolysis yields ... dimethylphosphorathioate and ammonia. ...Containers should be thoroughly drained and rinsed with aqueous alkali. Recommendable method: Incineration. Peer-review: Large amounts incinerate in a unit with effluent gas scrubbing. (Peer-review conclusions of an IRPTC expert consultation (May 1985)) /Monitor/

14. Transport Information

DOT

Fonofos
6.1
UN Pack Group: I

IATA

Fonofos
6.1,
UN Pack Group: I

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 10 ug/l

Regulatory Information

Status Regulation (EC)

>> 2002/2076

16. Other Information

Toxic Combustion Products:

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

>> Emits oxides of phosphorus fumes when burned.

"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."