ionz

SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : Formic acid
Catalog Number : io-2420
CAS Number : 64-18-6
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)

Note

>> Pictograms displayed are for > 99.9% (3365 of 3366) of reports that indicate hazard statements. This chemical does not meet GHS hazard criteria for < 0.1% (1 of 3366) of reports.

Pictogram(s)

GHS Hazard Statements

>> H226 (20.7%): Flammable liquid and vapor [Warning Flammable liquids]

>> H302 (17.8%): Harmful if swallowed [Warning Acute toxicity, oral]

>> H314 (99.7%): Causes severe skin burns and eye damage [Danger Skin corrosion/irritation]

>> H318 (18.7%): Causes serious eye damage [Danger Serious eye damage/eye irritation]

>> H331 (17.4%): Toxic if inhaled [Danger Acute toxicity, inhalation]

Precautionary Statement Codes

>> P210, P233, P240, P241, P242, P243, P260, P261, P264, P264+P265, P270, P271, P280, P301+P317, P301+P330+P331, P302+P361+P354, P303+P361+P353, P304+P340, P305+P354+P338, P316, P317, P321, P330, P363, P370+P378, P403+P233, P403+P235, P405, and P501

NFPA 704 Diamond

NFPA Health Rating

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

NFPA Fire Rating

>> 2 - Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air.

NFPA Instability Rating

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

EPA Safer Chemical:

EPA labels products so that consumers can easily choose ones that are safer for people and the environment. When consumers see the Safer Choice label on a product, they can be confident that the ingredients have been through a rigorous EPA review. The label means that EPA scientists have evaluated every ingredient in the product to ensure it meets Safer Choice's stringent criteria. When people use Safer Choice products, they are protecting their families and the environment by making safer chemical choices.

EPA Safer Chemical

>> Chemical: Formic acid

>> Green circle - The chemical has been verified to be of low concern based on experimental and modeled data.

Health Hazards:

>> Liquid causes skin and eye burns. Vapors are irritating and painful to breath. Vapor exposure may cause nausea and vomiting. (USCG, 1999)

ERG 2024, Guide 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

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

>> Methyl bromoacetate (UN2643) is an eye irritant/lachrymator (causes flow of tears).

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

>> Avoid any skin contact.

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

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

>> Special Hazards of Combustion Products: Toxic vapor generated in fires (USCG, 1999)

ERG 2024, Guide 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

>> Combustible material: may burn but does not ignite readily.

>> When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.

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

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

>> Containers may explode when heated.

>> Runoff may pollute waterways.

>> Substance may be transported in a molten form.

>> Combustible. Above 69 °C explosive vapour/air mixtures may be formed.

3. Composition/Information On Ingredients

Chemical name : Formic acid
CAS Number : 64-18-6
Molecular Formula : CH_2O_2
Molecular Weight : 46.0250 g/mol

4. First Aid Measures

First Aid:

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

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

>> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. 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. Corrosive chemicals will destroy the membranes of the mouth, throat, and esophagus and, in addition, 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. Transport the victim IMMEDIATELY to a hospital. (NTP, 1992)

ERG 2024, Guide 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

>> General First Aid:

>> Call 911 or emergency medical service.

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

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

>> Administer oxygen if breathing is difficult.

>> If victim is not breathing:

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

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

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

>> Remove and isolate contaminated clothing and shoes.

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

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

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

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

>> Keep victim calm and warm.

>> Keep victim under observation.

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

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

>> Specific First Aid:

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

>> Removal of solidified molten material from skin requires medical assistance.

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

First Aid Measures

Inhalation First Aid

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

5. Fire Fighting Measures

>> ... Vapors may travel long distances to ignition sources and flashback. Vapors in confined areas may explode when exposed to fire. Containers my explode in fire. ...

>> Excerpt from ERG Guide 153 [Substances - Toxic and/or Corrosive (Combustible)]:

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

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

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

>> 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 153 [Substances - Toxic and/or Corrosive (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)

Evacuation: ERG 2024, Guide 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

>> Immediate precautionary measure

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

>> Spill

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

>> Fire

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

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. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Cautiously neutralize spilled liquid with weak alkaline solution such as disodium carbonate. Then wash away with plenty of water.

Accidental Release Measures

Public Safety: ERG 2024, Guide 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

>> 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 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

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

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

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

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

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

>> DO NOT GET WATER INSIDE CONTAINERS.

Public Safety: ERG 2024, Guide 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

>> 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.

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

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

>> DO NOT GET WATER INSIDE CONTAINERS.

7. Handling And Storage

Safe Storage:

>> Separated from strong oxidants, strong bases, strong acids and food and feedstuffs. Well closed. Keep in a well-ventilated room.

Storage Conditions:

>> Store in a dry, well-ventilated place. Separate from oxidizing materials and alkaline substances.

8. Exposure Control/ Personal Protection

REL-TWA (Time Weighted Average)

>> 5 ppm (9 mg/m³)

>> TWA 5 ppm (9 mg/m3)

>> 5.0 [ppm]

PEL-TWA (8-Hour Time Weighted Average)

>> 5 ppm (9 mg/m³)

>> 5.0 [ppm]

>> 5 ppm as TWA; 10 ppm as STEL.

TLV-TWA (Time Weighted Average)

>> 5 ppm [1965]

TLV-STEL (Short Term Exposure Limit)

>> 10 ppm [1965]

EU-OEL

>> 9 mg/m

MAK (Maximale Arbeitsplatz Konzentration)

>> 9.5 mg/m

Emergency Response: ERG 2024, Guide 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

>> Small Fire

>> Dry chemical, CO2 or water spray.

>> Large Fire

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

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

>> Dike runoff from fire control for later disposal.

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

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

>> Do not get water inside containers.

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

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

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

>> ERPG-1: 3 ppm - one hour exposure limit: 1 = mild transient health effects or objectionable odor [AIHA]

>> ERPG-2: 25 ppm - one hour exposure limit: 2 = impaired ability to take protective action [AIHA]

>> ERPG-3: 250 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 very corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation of the vapour may cause lung oedema. The substance may cause effects on the energy metabolism. This may result in acidosis.

Fire Prevention

>> NO open flames. Above 69 °C use a closed system and ventilation.

Exposure Prevention

>> AVOID ALL CONTACT!

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.

Exposure Control and Personal Protection

Protective Clothing: ERG 2024, Guide 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

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

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

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

Protective Clothing: ERG 2024, Guide 153 (Formic acid; Formic acid, with more than 85% acid; Formic acid, with not less than 5% but less than 10% acid; Formic acid, with not less than 10% but not more than 85% acid)

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

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

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

Maximum Allowable Concentration (MAK)

>> 5.0 [ppm]

9. Physical And Chemical Properties

Molecular Weight:

>> 46.025

Exact Mass:

>> 46.005479302

Physical Description:

>> Formic acid appears as a colorless liquid with a pungent odor. Flash point 156 °F. Density 10.2 lb / gal. Corrosive to metals and tissue.

>> COLOURLESS FUMING LIQUID WITH PUNGENT ODOUR.

Color/Form:

>> Colorless fuming liquid

Odor:

>> Pungent, penetrating odor

Taste:

The sensation of flavor perceived in the mouth and throat on contact with a substance.

>> SOUR

Boiling Point:

>> 213.3 °F at 760 mmHg (NTP, 1992)

>> 101 °C

Melting Point:

>> 47.1 °F (NTP, 1992)

>> 8 °C

Flash Point:

>> 156 °F (NTP, 1992)

>> 69 °C

Solubility:

>> greater than or equal to 100 mg/mL at 70 °F (NTP, 1992)

>> Solubility in water: miscible

Density:

>> 1.22 at 68 °F (USCG, 1999) - Denser than water; will sink

>> Relative density (water = 1): 1.2

Vapor Density:

>> 1.6 (NTP, 1992) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 1.6

Vapor Pressure:

>> 35 mmHg at 68 °F ; 200 mmHg at 142.5 °F (NTP, 1992)

>> Vapor pressure, kPa at 20 °C: 4.6

LogP:

>> -0.54

Stability/Shelf Life:

>> May deteriorate in normal storage and cause hazard.

Autoignition Temperature:

>> 1114 °F (USCG, 1999)

>> 520 °C

Decomposition:

>> The substance decomposes on heating and on contact with strong acids (sulfuric acid) producing carbon monoxide.

Viscosity:

>> 1.607 mPas at 25 °C

Corrosivity:

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

>> Corrosive to metals

Heat of Combustion:

>> 254.6 kJ/mol at 25 °C (liquid)

Heat of Vaporization:

>> 20.10 kJ/mol at 25 °C

Surface Tension:

>> 37.13 mN/m at 25 °C

Ionization Potential:

>> 11.05 eV

Odor Threshold:

>> Odor Threshold Low: 1.6 [mmHg]

>> Odor Threshold High: 340.0 [mmHg]

>> Odor threshold from AIHA

Refractive Index:

>> Index of refraction: 1.3714 at 20 °C/D

Dissociation Constants:

Acidic pKa

>> 3.742

pKa

>> 3.75 (at 25 °C)

>> pKa = 3.75 at 20 °C

Relative Evaporation Rate:

The rate at which a material will vaporize (evaporate, change from liquid to vapor), compared to the rate of vaporization of a specific known material.

>> 2.1 (Butyl acetate = 1)

10. Stability And Reactivity

>> Fumes in air. Soluble in water with release of heat.

CSL No

>> CSL00178

Reactants/Reagents

>> Formic acid + Hydrogen peroxide

Warning Message

>> Reaction resulted in an explosion

GHS Category

>> Explosive

Reaction Scale

>> Not Available

Reference Source

>> User Reported

Modified Date

>> 04/22/2022

Create Date

>> 04/22/2022

11. Toxicological Information

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

>> Formic Acid

Reference Dose (RfD), Chronic

>> 9 x 10^-1 mg/kg-day

Reference Dose (RfD), Subchronic

>> 9 x 10^-1 mg/kg-day

Reference Concentration (RfC), Subchronic

>> 9 x 10^-4 mg/m^3

PPRTV Assessment

>> PDF Document

Weight-Of-Evidence (WOE)

>> Inadequate information to assess carcinogenic potential

Last Revision

>> 2010

Exposure Routes:

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

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

Inhalation Exposure

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

Skin Exposure

>> MAY BE ABSORBED! Pain. Blisters. Serious skin burns.

Eye Exposure

>> Pain. Redness. Severe deep burns. Blurred vision.

Ingestion Exposure

>> Sore throat. Burning sensation. Abdominal pain. Abdominal cramps. Vomiting. Diarrhoea.

>> irritation eyes; skin, throat; skin burns, dermatitis; lacrimation (discharge of tears); rhinorrhea (discharge of thin nasal mucus); cough, dyspnea (breathing difficulty); nausea

Target Organs:

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

>> Eyes, skin, respiratory system

Adverse Effects:

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

>> Dermatotoxin - Skin burns.

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

Toxicity Data:

>> LC50 (rat) = 15,000 mg/m3/15m

Antidote and Emergency Treatment:

>> ... Hemodialysis accelerates both the elimination of both methanol and formic acid and also assists in correction of metabolic acidosis. Experimental data suggests that the administration of folic acid may be of benefit by hastening the metabolism of formic acid to carbon dioxide. Prompt ... /treatment/ can probably decr the morbidity and mortality /associated with this form/ of poisoning.

Human Toxicity Excerpts:

>> /HUMAN EXPOSURE STUDIES/ To determine if /formic acid/ (FA) levels are higher in the alcohol-drinking population and to assess its neurotoxicity in organotypic hippocampal rat brain slice cultures. ... Serum and /cerebral spinal fluid/ (CSF) FA was measured in samples from both ethanol abusing and control patients, who presented to a hospital emergency department. FA's neurotoxicity and its reversibility by folic acid were assessed using organotypic rat brain hippocampal slice cultures using clinically relevant concentrations. Serum FA levels in the alcoholics (mean +/- SE: 0.416 +/- 0.093 mmol/l, n = 23) were significantly higher than in controls (mean +/- SE: 0.154 +/- 0.009 mmol/l, n = 82) ($p < 0.0002$). FA was not detected in the controls' CSF (n = 20), whereas it was >0.15 mmol/l in CSF of 3 of the 4 alcoholic cases. Low doses of FA from 1 to 5 mmol/l added for 24, 48 or 72 hours to the rat brain slice cultures caused neuronal death as measured by propidium iodide staining. When folic acid (1 micromol/l) was added with the FA, neuronal death was prevented.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ In a ... rabbit, pure liquid formic acid applied with a brush to part of cornea ... /caused/ immediate local opacity. This began to clear ... in 5 days, but by that time there was hypopyon, posterior subcapsular lens opacity, absence of portions of corneal endothelium, infiltration, and growth of new blood vessels at the limbus. The iris was also infiltrated and hyperemic. In another rabbit a five minute application of formic acid diluted to 10% also caused dense white local opacity, and at 5 days the reaction in the cornea was similar to that of the eye exposed to concentrated acid, but hypopyon was absent.

Non-Human Toxicity Values:

>> LD50 Dog oral 4000 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.

>> In 13-week studies, groups of 10 animals of each species and sex were exposed to formic acid at concentrations of 0, 8, 16, 32, 64, and 128 ppm for 6 hr a day, 5 days a week. Two mice, 1 male and 1 female, died in the 128 ppm groups. Body weight gains were significantly decreased in mice exposed to 64 and 128 ppm formic acid. Microscopic changes in rats and mice ranged from minimal to mild in severity and generally were limited to animals in the 128 ppm groups. Lesions related to exposure to formic acid consisted of squamous metaplasia and degeneration of the respiratory and olfactory epithelia, respectively. Hematologic and serum biochemical changes at interim and terminal time points were minimal to mild and, generally, were consistent with hemoconcentration.

12. Ecological Information

Resident Soil (mg/kg)

>> 2.90e+01

Industrial Soil (mg/kg)

>> 1.20e+02

Resident Air (ug/m3)

>> 3.10e-01

Industrial Air (ug/m3)

>> 1.30e+00

Tapwater (ug/L)

>> 6.30e-01

MCL (ug/L)

>> 4.00e+03

Risk-based SSL (mg/kg)

>> 1.30e-04

Chronic Oral Reference Dose (mg/kg-day)

>> 9.00e-01

Chronic Inhalation Reference Concentration (mg/m3)

>> 3.00e-04

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Soil Saturation Concentration (mg/kg)

>> 1.06e+05

ICSC Environmental Data:

>> The substance is harmful to aquatic organisms.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SEDIMENT: The formic acid concentration in the 0-1 cm layer of sediment at 2 stations in Lake Biwa in Japan was 437 and 64 ppm (wet weight), while the respective concentration in the 9-10 cm layer was 23-110 ppm(1).

Fish/Seafood Concentrations:

Concentrations of this compound in fish or seafood.

>> Formic acid has been detected in the poison or defense systems of cnidarians(1), (e.g. jellyfish, stinging coral)(2).

Animal Concentrations:

Concentrations of this compound in animals.

>> Formic acid is found in the red ant, Formica rufa, and has been detected in the poison or defense systems of ants, bees, and other insects(1).

13. Disposal Considerations

Spillage Disposal

>> Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Cautiously neutralize spilled liquid with weak alkaline solution such as disodium carbonate. Then wash away with plenty of water.

Disposal Methods

>> Generators of waste (equal to or greater than 100 kg/mo) containing this contaminant, EPA hazardous waste number U123, must conform with USEPA regulations in storage, transportation, treatment and disposal of waste.

>> A good 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. A good 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. A good 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.

>> 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.

>> The following wastewater treatment technologies have been investigated for formic acid: biological treatment.

>> For more Disposal Methods (Complete) data for FORMIC ACID (7 total), please visit the HSDB record page.

14. Transport Information

DOT

Formic acid
8
UN Pack Group: II
Reportable Quantity of 5000 lb or 2270 kg

IATA

Formic acid
8,
UN Pack Group: II

15. Regulatory Information

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.

>> Formic acid is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Formic acid

REACH Registered Substance

>> Status: Active Update: 01-12-2022 https://echa.europa.eu/registration-dossier/-/registered-dossier/15127

>> Status: Active Update: 23-03-2018 https://echa.europa.eu/registration-dossier/-/registered-dossier/23051

New Zealand EPA Inventory of Chemical Status

>> Formic acid with more than 85% acid by mass: HSNO Approval: HSR000979 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.

Other Safety Information

Chemical Assessment

>> IMAP assessments - Formic acid: Environment tier I assessment

>> IMAP assessments - Formic acid: Human health tier II assessment

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