SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : Acenaphthene
Catalog Number : io-1651
CAS Number : 83-32-9
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)

Note

>> Pictograms displayed are for 95.5% (105 of 110) of reports that indicate hazard statements. This chemical does not meet GHS hazard criteria for 4.5% (5 of 110) of reports.

Pictogram(s)

>> Warning

GHS Hazard Statements

>> H319 (80.9%): Causes serious eye irritation [Warning Serious eye damage/eye irritation]

>> H400 (88.2%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]

>> H410 (87.3%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P264+P265, P273, P280, P305+P351+P338, P337+P317, P391, and P501

Health Hazards:

>> SYMPTOMS: Symptoms of exposure to this compound may include irritation of the skin, eyes, mucous membranes and upper respiratory tract. If ingested, it can cause vomiting. Chronic exposure may result in kidney and liver damage.

>> ACUTE/CHRONIC HAZARDS: This compound is harmful by inhalation, ingestion or skin absorption. It is an irritant of the skin, eyes, mucous membranes and upper respiratory tract. When heated to decomposition it emits toxic fumes of carbon monoxide and carbon dioxide. (NTP, 1992)

>> Flash point data for this chemical are not available. It is probably combustible. (NTP, 1992)

>> Combustible. Finely dispersed particles form explosive mixtures in air.

3. Composition/Information On Ingredients

Chemical name : Acenaphthene
CAS Number : 83-32-9
Molecular Formula : C12H10
Molecular Weight : 154.2100 g/mol

4. First Aid Measures

First Aid:

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

>> SKIN: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.

>> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.

>> INGESTION: DO NOT INDUCE VOMITING. 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. Be prepared to transport the victim to a hospital if advised by a physician. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital. (NTP, 1992)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest.

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.

5. Fire Fighting Measures

>> Excerpt from ERG Guide 171 [Substances (Low to Moderate Hazard)]:

>> CAUTION: Fire involving Safety devices (UN3268) and Fire suppressant dispersing devices (UN3559) may have a delayed activation and a risk of hazardous projectiles. Extinguish the fire at a safe distance.

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

>> LARGE FIRE: Water spray, fog or regular foam. Do not scatter spilled material with high-pressure water streams. 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: 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, dry powder, foam, 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 171 [Substances (Low to Moderate Hazard)]:

>> 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: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

7. Handling And Storage

Safe Storage:

>> Separated from strong oxidants. Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.

Storage Conditions:

>> Keep container tightly closed in a dry and well-ventilated place. Storage class (TRGS 510): Non Combustible Solids.

8. Exposure Control/ Personal Protection

>> 8 Hr Time Weighted Avg (TWA): 0.2 mg/cu m. /Coal tar pitch volatiles, as benzene soluble aerosol/

Inhalation Risk:

>> A harmful concentration of airborne particles can be reached quickly when dispersed.

Fire Prevention

>> NO open flames. Closed system, dust explosion-proof electrical equipment and lighting. Prevent deposition of dust.

Exposure Prevention

>> PREVENT DISPERSION OF DUST!

Inhalation Prevention

>> Use local exhaust or breathing protection.

Skin Prevention

>> Protective gloves.

Eye Prevention

>> Wear safety goggles.

Ingestion Prevention

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

9. Physical And Chemical Properties

Molecular Weight:

>> 154.21

Exact Mass:

>> 154.078250319

Physical Description:

>> Acenaphthene appears as white needles. Melting point 93.6 °C. Soluble in hot alcohol. Denser than water and insoluble in water. Hence sinks in water. May irritate skin and mucous membranes. Emits acrid smoke and irritating fumes when heated to decomposition. Derived from coal tar and used to make dyes, pharmaceuticals, insecticides, fungicides, and plastics.

>> WHITE-TO-BEIGE CRYSTALS.

Color/Form:

>> White needles

Boiling Point:

>> 534 °F at 760 mmHg (NTP, 1992)

>> 279 °C

Melting Point:

>> 203 °F (NTP, 1992)

>> 95 °C

Flash Point:

>> 125.0 °C (257.0 °F) - closed cup

>> 135 °C o.c.

Solubility:

>> less than 1 mg/mL at 68 °F (NTP, 1992)

>> Solubility in water, g/100ml at 25 °C: 0.0004

Density:

>> 1.024 at 210 °F (NTP, 1992) - Denser than water; will sink

>> 1.2 g/cm³

Vapor Density:

>> 5.32 (NTP, 1992) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 5.3

Vapor Pressure:

>> 0.001 to 0.01 mmHg at 68 °F ; 5 mmHg at 238.6 °F (NTP, 1992)

>> Vapor pressure, Pa at 25 °C: 0.3

LogP:

>> log Kow = 3.92

>> 3.9/4.5

Stability/Shelf Life:

>> Stable under recommended storage conditions.

Autoignition Temperature:

>> >450 °C

Decomposition:

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

Heat of Combustion:

>> -4.033X10+7 J/kg

Heat of Vaporization:

>> 3.48X10+5 J/kg at 40 °C

Odor Threshold:

>> Odor detection in air, 8.0X10-2 ppm (chemically pure)

Refractive Index:

>> Index of refraction: 1.6048 at 95 °C

Collision Cross Section:

Collision cross section (CCS) represents the effective area for the interaction between an individual ion and the neutral gas through which it is traveling (e.g., in ion mobility spectrometry (IMS) experiments). It quantifies the probability of a collision taking place between two or more particles.

>> 127.7 Å² [M*]+

10. Stability And Reactivity

>> Insoluble in water.

11. Toxicological Information

Toxicity Summary:

>> IDENTIFICATION AND USE: Acenaphthene is a solid. It is used as an intermediate for manufacture of pharmaceuticals. Polycyclic aromatic hydrocarbons are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. HUMAN EXPOSURE AND TOXICITY: Acenaphthene is oxidized by human P450s 2A6 and 2A13 and other P450s to form several mono- and dioxygenated products. ANIMAL STUDIES: Acenaphthene at 2 g/kg body weight administered orally to seven young rats daily for 32 days caused loss of body weight and changes in peripheral blood, increased aminotransferase levels in blood serum, and produced mild morphological damage to both the liver and kidney. 100 rats were exposed for 5-months to acenaphthene at a level of 12 mg/cu m for four hours a day, six days per week. Toxic effects on the blood, lung, and glandular constituents were observed. The bronchial epithelium showed hyperplasia and metaplasia, which may have been symptoms of the pneumonia that killed a large number of animals. No signs of malignancy appeared during the 8-month post-exposure observation period. Acenaphthene at 0.10 % accelerated the liver regeneration in partially hepatectomized male rats. An acenaphthene-containing aromatic subfraction was isolated from shale-derived crude oil and tested for mutagenicity using Salmonella typhimurium TA98. No increases in mutation frequency were observed with or without metabolic activation. ECOTOXICITY STUDIES: Treatment of Allium cepa root meristem cells with acenaphthene vapor for 12-96 hr caused anomalies leading to random development of the cells. It caused disorientation of microtubules, in Allium cepa and Phleoeum pratense, resulting in altered cellular expansion. A set of embryo-larval bioassays were conducted with the fathead minnow. The no effect levels when compared to the controls was 0.226 mg/L acenaphthene.

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

>> Acenaphthene

Reference Dose (RfD), Subchronic

>> 2 x 10^-1 mg/kg-day

PPRTV Assessment

>> PDF Document

Weight-Of-Evidence (WOE)

>> Inadequate information to assess carcinogenic potential

Last Revision

>> 2011

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

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

Chemical

>> Acenaphthene

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

>> 400

Reference

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

Carcinogen Classification:

This section provides the International Agency for Research on Cancer (IARC) Carcinogenic Classification and related monograph links. In the IARC Carcinogenic classification, chemicals are categorized into four groups: Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), Group 2B (possibly carcinogenic to humans), and Group 3 (not classifiable as to its carcinogenicity to humans).

IARC Carcinogenic Agent

>> Acenaphthene

IARC Carcinogenic Classes

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

IARC Monographs

>> Volume 92: (2010) Some Non-heterocyclic Polycyclic Aromatic Hydrocarbons and Some Related Exposures

>> 3, not classifiable as to its carcinogenicity to humans. (L135)

Health Effects:

>> PAHs are carcinogens and have been associated with the increased risk of skin, respiratory tract, bladder, stomach, and kidney cancers. They may also cause reproductive effects and depress the immune system. (L10)

Exposure Routes:

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

>> Oral (L10) ; inhalation (L10)

>> Acute exposure to PAHs causes irritation and inflammation of the skin and lung tissue. (A10)

Target Organs:

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

>> Hepatic

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.

Toxicity Data:

>> LD50: 600 mg/kg (Intraperitoneal, Rat)

Treatment:

Treatment when exposed to toxin

>> There is no known antidote for PAHs. Exposure is usually handled with symptomatic treatment. (L10)

Interactions:

>> Pretreatment of rats with 20 mg/kg ip dose of acenaphthene prolonged by up to 50% the duration of paralysis induced with 90 mg/kg zoxazolamine 24 hr later.

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 if 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. /Naphthalene and Related Compounds/

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Subchronic or Prechronic Exposure/ Acenaphthene at 2 g/kg body weight administered orally in olive oil to seven young rats (sex not specified) daily for 32 days caused loss of body weight and changes in peripheral blood, increased aminotransferase levels in blood serum, and produced mild morphological damage to both the liver and kidney. ... The morphological damage to the kidney and the liver was greater when acenaphthene was administered in a subacute manner than when an acute dose was given. After 32 days of treatment the animals showed mild bronchitis and localized inflammation of the peribronchial tissue.

Non-Human Toxicity Values:

>> LD50 Rats i.p. 600 mg/kg

12. Ecological Information

Resident Soil (mg/kg)

>> 3.60e+03

Industrial Soil (mg/kg)

>> 4.50e+04

Tapwater (ug/L)

>> 5.30e+02

MCL (ug/L)

>> 5.00e-01

Risk-based SSL (mg/kg)

>> 5.50e+00

Chronic Oral Reference Dose (mg/kg-day)

>> 6.00e-02

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Fraction of Contaminant Absorbed Dermally from Soil

>> 0.13

ICSC Environmental Data:

>> The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. It is strongly advised not to let the chemical enter into the environment.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SEDIMENT: Sediment from the Duwamish River delta, WA contained acenaphthene at an average concentration of 160 ng/g(1). Sediments from three sites in Eagle Harbor and one at President Point, WA contained acenaphthene at an average concentration of 94, 5000, 43 and less than 2.0 ng/g for 4, 9, 2 and 1 sample(s), respectively(2). Acenaphthene was detected in sediments from Dohkai Bay(3) and Puget Sound(4) WA, the Elizabeth River, VA(5,6), the Black River,

OH(7) and the Great Lakes Michigan(8) and Ontario(9). Three sediment samples from the New York, NY harbor contained acenaphthene concentrations of 500, 500 and 80 ng/g(10). Acenaphthene was detected in 5 of 30 samples form Casco Bay, ME at concentrations of 140, 34, 58, 1150 and 84 ppb(11). Acenaphthene was detected in 8 of 10 sediment samples from streams feeding Lake Erie within the city of Erie, PA at concentrations of 3366, 1316, 568, 513, 231, 343, 175 and 198 ug/kg(12). Sediment samples from nearby the Hooker Chemical and Plastics Corp disposal site at Love Canal, NY contained acenaphthene(13). Between March 1984 and April 1985, acenaphthene was detected in sediments located 1 km from a sewage outfall at the Fraser River Estuary, British Columbia, Canada at an average concentration of 53 ng/g(14). Two of 5 sediment samples from along the "Golfe de Gascogne", France contained acenaphthene at concentrations of 1 and 32 ng/g(15).

Fish/Seafood Concentrations:

Concentrations of this compound in fish or seafood.

>> The level of acenaphthene in the same digestive gland oil of lobsters was 36.4 and 64.0 ng/g according to 2 different laboratories(1). Bullhead catfish fish from the Black River, OH and Striped Bass from the Potomac River, MD contained acenaphthene at concentrations of 39 and 7 ppb, respectively(2). Both oysters and clams from Lake Pontchartrain, LA contained acenaphthene at an average concentration of 46 ppb(3). Fish samples from the Great Lakes harbors and tributary mouths contained acenaphthene(4,5). Snails from 2 sites at Pensacola Bay, FL contained acenaphthene at average concentration of 2.06 and 8.80 ug/kg(6). Coral rock oysters (Saccostrea cucculata) collected in Sept 1982 from six locations at Mermaid Sound in NW Australia contained acenaphthene at concentrations ranging from less than 0.2 to 2 ppb with a 65% frequency of occurrence(7). Acenaphthene was detected in mussels (Mytilus galloprovincialis) from the Thermaikos Gulf, Greece(8). Acenaphthene concentrations of 0.15-16 ng/g wet weight were detected in oysters collected from 18 stations in the Yatsushiro Sea, Japan in 2010(9). An analysis of farmed and wild salmon, collected in 1999-2000, found mean acenaphthene concentrations of 0.83 and 1.10 ng/g, respectively(10). Edible fish taken from the Gornti River, India in 2004-2005 contained a mean acenaphthene + fluorene concentration of 0.92 ng/g wet wt with detection in 50% of all samples(11).

Animal Concentrations:

Concentrations of this compound in animals.

>> The plasma of live stranded loggerhead sea turtles was sampled at the beginning and end of a rehabilitation period for various pollutants. Mean acenaphthene concentration at the beginning and end was 0.006 ng/mL and half of the detection limit (0.03 ng/mL), respectively(1).

Average Daily Intake:

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

>> Estimates of daily total PAH intake from food(which includes acenaphthene) vary widely, ranging from a few nanograms to a few micrograms per person(1). The mean dietary intake of acenaphthene in the United Kingdom (years 1986-1987, 2000) is estimated as 0.98-1.61 ug/day per person(2).

13. Disposal Considerations

Spillage Disposal

>> Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

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.

>> SRP: Wastewater from contaminant suppression, cleaning of protective clothing/equipment, or contaminated sites should be contained and evaluated for subject chemical or decomposition product concentrations. Concentrations shall be lower than applicable environmental discharge or disposal criteria. Alternatively, pretreatment and/or discharge to a permitted wastewater treatment facility is acceptable only after review by the governing authority and assurance that "pass through" violations will not occur. Due consideration shall be given to remediation worker exposure (inhalation, dermal and ingestion) as well as fate during treatment, transfer and disposal. If it is not practicable to manage the

chemical in this fashion, it must be evaluated in accordance with EPA 40 CFR Part 261, specifically Subpart B, in order to determine the appropriate local, state and federal requirements for disposal.

>> Product: Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber; Contaminated packaging: Dispose of as unused product.

>> Incineration or permanganate oxidation.

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

14. Transport Information

DOT

Acenaphthene
9
UN Pack Group: III
Reportable Quantity of 100 lb or 45

IATA

Acenaphthene
9,
UN Pack Group: III

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.

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

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Acenaphthylene, 1,2-dihydro-

REACH Registered Substance

>> Status: Active Update: 06-04-2018 https://echa.europa.eu/registration-dossier/-/registered-dossier/10180

>> Status: No longer Valid Update: 18-08-2011 https://echa.europa.eu/registration-dossier/-/registered-dossier/6742

New Zealand EPA Inventory of Chemical Status

>> Acenaphthylene, 1,2-dihydro-: Does not have an individual approval but may be used under an appropriate group standard

16. Other Information

Toxic Combustion Products:

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

>> Poisonous gases are produced in fire, including carbon monoxide.

Other Safety Information

Chemical Assessment

>> IMAP assessments - Acenaphthylene, 1,2-dihydro-: Environment tier I assessment

>> IMAP assessments - Acenaphthylene, 1,2-dihydro-: Human health tier I assessment

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