SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : n-Hexane
Catalog Number : io-2493
CAS Number : 110-54-3
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 99.5% (206 of 207) of reports that indicate hazard statements. This chemical does not meet GHS hazard criteria for 0.5% (1 of 207) of reports.

Pictogram(s)

GHS Hazard Statements

>> H225 (57.5%): Highly Flammable liquid and vapor [Danger Flammable liquids]

>> H304 (39.6%): May be fatal if swallowed and enters airways [Danger Aspiration hazard]

>> H315 (77.8%): Causes skin irritation [Warning Skin corrosion/irritation]

>> H317 (42.5%): May cause an allergic skin reaction [Warning Sensitization, Skin]

>> H319 (18.8%): Causes serious eye irritation [Warning Serious eye damage/eye irritation]

>> H336 (39.6%): May cause drowsiness or dizziness [Warning Specific target organ toxicity, single exposure; Narcotic effects]

>> H361 (39.6%): Suspected of damaging fertility or the unborn child [Warning Reproductive toxicity]

>> H373 (30%): May causes damage to organs through prolonged or repeated exposure [Warning Specific target organ toxicity, repeated exposure]

>> H411 (35.3%): Toxic to aquatic life with long lasting effects [Hazardous to the aquatic environment, long-term hazard]

>> H412 (42%): Harmful to aquatic life with long lasting effects [Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P203, P210, P233, P240, P241, P242, P243, P260, P261, P264, P264+P265, P271, P272, P273, P280, P301+P316, P302+P352, P303+P361+P353, P304+P340, P305+P351+P338, P318, P319, P321, P331, P332+P317, P333+P317, P337+P317, P362+P364, P370+P378, P391, P403+P233, P403+P235, P405, and P501

NFPA 704 Diamond

NFPA Health Rating

>> 0 - Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials.

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

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

Health Hazards:

>> INHALATION causes irritation of respiratory tract, cough, mild depression, cardiac arrhythmias. ASPIRATION causes severe lung irritation, coughing, pulmonary edema; excitement followed by depression. INGESTION causes nausea, vomiting, swelling of abdomen, headache, depression. (USCG, 1999)

>> Behavior in Fire: Vapors may explode (USCG, 1999)

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

3. Composition/Information On Ingredients

Chemical name : n-Hexane
CAS Number : 110-54-3
Molecular Formula : C6H14
Molecular Weight : 86.1800 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. Volatile chemicals 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. IMMEDIATELY transport the victim to a hospital. (NTP, 1992)

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

>> Rinse mouth. Do NOT induce vomiting. Rest. Refer for medical attention .

5. Fire Fighting Measures

>> Excerpt from ERG Guide 128 [Flammable Liquids (Water-Immiscible)]:

>> CAUTION: The majority of these products have a very low flash point. Use of water spray when fighting fire may be inefficient. CAUTION: For mixtures containing alcohol or polar solvent, alcohol-resistant foam may be more effective.

>> SMALL FIRE: Dry chemical, CO2, water spray or regular foam. If regular foam is ineffective or unavailable, use alcohol-resistant foam.

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

>> FIRE INVOLVING TANKS, RAIL TANK CARS OR HIGHWAY TANKS: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. For petroleum crude oil, do not spray water directly into a breached tank car. This can lead to a dangerous boil over. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks in direct contact with flames. For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn. (ERG, 2024)

>> Use powder, AFFF, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

6. Accidental Release Measures

Isolation and Evacuation:

Isolation and evacuation measures to take when a large amount of this chemical is accidentally released in an emergency.

>> Excerpt from ERG Guide 128 [Flammable Liquids (Water-Immiscible)]:

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

>> LARGE SPILL: Consider initial downwind evacuation for at least 300 meters (1000 feet).

>> FIRE: If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2024)

Spillage Disposal:

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

>> Consult an expert! Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Remove all ignition sources. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. 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. Separated from strong oxidants. Well closed.

Storage Conditions:

>> Drums should be stored in a well-ventilated area in fire-resistant containers. Metal containers should be electrically-grounded, when liquid is being transferred.

8. Exposure Control/ Personal Protection

REL-TWA (Time Weighted Average)

>> 50 ppm (180 mg/m³)

>> TWA 50 ppm (180 mg/m3)

>> 500.0 [ppm]

PEL-TWA (8-Hour Time Weighted Average)

>> 500 ppm (1800 mg/m³)

>> 50.0 [ppm]

>> 50 ppm as TWA; (skin); BEI issued.

TLV-TWA (Time Weighted Average)

>> 50 ppm [1996]

EU-OEL

>> 72 mg/m

MAK (Maximale Arbeitsplatz Konzentration)

>> 180 mg/m

Inhalation Risk:

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

Effects of Short Term Exposure:

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

Effects of Long Term Exposure:

>> Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system and peripheral nervous system. This may result in polyneuropathy. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

Fire Prevention

>> NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.

Inhalation Prevention

>> Use ventilation, local exhaust or breathing protection.

Skin Prevention

>> Protective gloves.

Eye Prevention

>> Wear safety goggles, 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

Exposure Summary

>> Biological Exposure Indices (BEI) [ACGIH] - 2,5-Hexanedione (without hydrolysis) in urine = 0.5 mg/L end of shift;

Maximum Allowable Concentration (MAK)

>> 50.0 [ppm]

9. Physical And Chemical Properties

Molecular Weight:

>> 86.18

Exact Mass:

>> 86.109550447

Physical Description:

>> N-hexane is a clear colorless liquids with a petroleum-like odor. Flash points -9 °F. Less dense than water and insoluble in water. Vapors heavier than air. Used as a solvent, paint thinner, and chemical reaction medium.

>> VOLATILE COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Color/Form:

>> Liquid

Odor:

>> Gasoline-like odor

Boiling Point:

>> 156 °F at 760 mmHg (NTP, 1992)

>> 69 °C

Melting Point:

>> -139 °F (NTP, 1992)

>> -95 °C

Flash Point:

>> -9.4 °F (NTP, 1992)

>> -22 °C c.c.

Solubility:

>> less than 1 mg/mL at 61.7 °F (NTP, 1992)

>> Solubility in water, g/100ml at 20 °C: 0.0013

Density:

>> 0.659 at 68 °F (USCG, 1999) - Less dense than water; will float

>> Relative density (water = 1): 0.7

Vapor Density:

>> 2.97 (NTP, 1992) - Heavier than air; will sink (Relative to Air)

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

Vapor Pressure:

>> 120 mmHg at 68 °F ; 180 mmHg at 77 °F (NTP, 1992)

>> Vapor pressure, kPa at 20 °C: 17

LogP:

>> log Kow = 3.90

>> 3.9

Autoignition Temperature:

>> 437 °F (USCG, 1999)

>> 225 °C

Decomposition:

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

Viscosity:

>> 0.377 cP at 15 °C

Heat of Combustion:

>> 4163.2 kJ/mol

Heat of Vaporization:

>> 31.56 kJ/mol at 25 °C

Surface Tension:

>> 17.89 mN/m at 25 °C

Ionization Potential:

>> 10.18 eV

Odor Threshold:

>> Odor Threshold Low: 65.0 [mmHg]

>> Odor Threshold High: 248.0 [mmHg]

>> Odor threshold from AIHA

Refractive Index:

>> Index of refraction: 1.3727 at 25 °C

10. Stability And Reactivity

>> Highly flammable. Insoluble in water.

>> Highly Flammable

11. Toxicological Information

Toxicity Summary:

>> IDENTIFICATION: n-Hexane is a straight chain saturated hydrocarbon obtained from certain petroleum fractions after various thermal or catalytic cracking steps. Commercial hexane may contain from 20%-85& n-Hexane and various amounts of hexane isomer, 2-methylpentane, 3-methylpentane, 2-3-dimethylbutene, cyclopentane, cyclohexane and small quantities of pentane and heptane isomers, acetone, methyl ethyl ketone, dichloromethane and trichloroethylene. Trace amounts of benzene may be present. N-Hexane is a colorless liquid and solubility in water is low. It is miscible with alcohol, chloroform and ether. Main uses are: rubber and adhesive solvent in shoe factories; extraction of soybean oil, callous seed oil and flaxseed oil. It is used in the pharmaceutical and cosmetic industries and is a cleaning agent for textiles, furniture and leather products. N-Hexane is also used for: determination of the refractive index of minerals, filling for thermometers and denaturant. HUMAN EXPOSURE: The target organs are: central nervous system and peripheral nervous system, respiratory system, heart, skin and eyes. Chemical pneumonia can occur after ingestion and and aspiration to the lungs. CNS depression, convulsions, coma and death may follow acute exposures to large concentrations. Inhalation of n-hexane usually causes eye, nose, throat and respiratory irritation, which are rapidly reversible when exposure is discontinued. Symptoms are more severe is ingestion or inhalation are associated with exposure to other hydrocarbons which may potentiate the effects. Exogenous catecholamines may precipitate a fatal ventricular arrhythmia in the sensitized myocardium. Acute exposure to considerable concentrations of n-hexane may cause cough, wheezing, bloody frothy sputum, headache, dizziness, tachycardia and fever. Gastrointestinal symptoms may result. Respiratory system: slow and shallow respiration; aspiration of n-hexane may cause pulmonary edema and chemical pneumonia. Cardiovascular system: tachycardia and ventricular dysrhythmia. Central nervous system: vertigo, giddiness, CNS depression syndrome. In heavy exposures unconsciousness may result. Peripheral nervous system: chronic exposure may produce important peripheral neuropathy (motor sensory) and CNS abnormalities. Gastrointestinal tract: nausea, vomiting and anorexia. Adults may be exposed in the workplace or in case of suicide attempts. Glue sniffing or n-hexane sniffing puts individuals at risk. There is a potential for accidental ingestion may occur in children. Laboratory workers which use the solvent for extraction procedures, chemists and pharmacists may be exposed. In the factory, glues and adhesives industry employees and those in printing and painting occupations. N-Hexane is absorbed following inhalation, ingestion or by topical application to the skin. In human volunteers about 28%

of inhaled n-Hexane was taken up by the lungs. Alveolar retention is about 25% of the inhaled dose of n-hexane and the final absorption is 15%-17% in relation to the total respiratory uptake. Alveolar uptake was greater in obese individuals. Although the alveolar uptake rate decreased during physical exercise, the total uptake of n-hexane increased slightly as a result of the higher lung ventilation rate. Concentrations of n-hexane correlated with blood concentrations in industrial workers exposed to commercial hexane. It is poorly absorbed by the gastrointestinal system. Dermal absorption is very slow. Peak blood levels occur in less than 1 hour following inhalation or percutaneous exposure. N-Hexane has great affinity for high lipid content tissues and is rapidly metabolized to hydroxylated compounds before being converted to 2,5-hexanedione. The respiratory elimination of n-hexane in recently exposed workers was biphasic. The median half-lives of the fast and slow phases were 11minutes and 99 minutes. Workers exposed to n-hexane for about 7 hours/day without protective devices had the following metabolites in the urine: 2-hexanol, 2-methyl-2-pentanol, 3-methyl-2-pentanol, cyclohexanol, cyclohexane and trichloroethanol. In humans exposed to concentrations of up to 200 ppm, steady state blood levels were dose dependent; accumulation occurred in humans exposed to as little as 1 ppm. ANIMAL STUDIES: At the first step of oxidative metabolism by cytochrome p-450, the carbons 1,2,3 of n-hexane molecule are hydroxylated and form hexanols in different proportions in all species of animals. N-Hexane is metabolized by mixed function oxidase system in the liver forming alcohols which are conjugated to glucuronic acid or converted to carbon monoxide. 1-Hexanol and 3-hexonal are less toxic metabolites. The former is oxidized to hexanoic acid which undergoes the usual lipid metabolism. 2,5-Hexanedione was detected in urine. In rats exposed to n-hexane, important alterations in the quantity and composition of pulmonary surfactant in rats after short term exposure. The lungs of rats exposed to hexane at different concentrations showed a direct toxic effect on pneumocytes; fatty degeneration, change of alveolar bodies in type 2 pneumocytes and increased detachment of cells. Severe atrophy involving the seminiferous tubules with loss of the nerve growth factor in immunoreactive germ cell line of rats after 61 days of exposure was noted. Permanent testicular damage was found in some animals which had a total loss of the germ cell line lasting up to 14 months after the post exposure period. Simultaneous administration of n-hexane with toluene or xylene did not cause germ cell line alterations or testicular atrophy. In vitro toxicity of n-hexane and 2,5-hexanedione has been evaluated in the isolated perfused rabbit heart. The force of cardiac contraction was significantly reduced following 1 hour of perfusion with n-hexane or 2,5-hexanedione. Spinal neuron cell cultures exposed to n-hexane and butanone developed the neural swelling faster than when exposed to n-hexane. Animal tests have been negative for teratogenic effects. In pregnant rats showed n-hexane blood concentrations in the fetus equal to that found in maternal blood. Isopropanol enhances the induction of n-hexane metabolizing enzymes and increases the 2-hexanol concentrations in the liver and kidney. Methyl isobutyl ketone mixed with n-hexane significantly increased aniline hydroxylase and cytochrome P450 activity in the liver of exposed hens.

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

>> n-Hexane

Reference Dose (RfD), Subchronic

>> 3 x 10^-1 mg/kg-day

Reference Concentration (RfC), Subchronic

>> 2 mg/m^3

PPRTV Assessment

>> PDF Document

Weight-Of-Evidence (WOE)

>> See the IRIS entry for n-Hexane

Last Revision

>> 2009

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

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

Chemical

>> Hexane

Benchmark Remarks

>> not assessed under IRIS as of 12/23/2005; listed as n-Hexane

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).

>> Hexane is found in gasoline, which is possibly carcinogenic to humans (Group 2B). (L135)

Health Effects:

>> Hexane mainly affects the nervous system. It causes degeneration of the peripheral nervous system (and eventually the central nervous system), starting with damage to the nerve axons. Exposure to hexane may also damage the lungs and reproductive system. (L977, L978)

Exposure Routes:

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

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

Inhalation Exposure

>> Dizziness. Drowsiness. Lethargy. Headache. Nausea. Weakness. Unconsciousness.

Skin Exposure

>> Dry skin. Redness. Pain.

Eye Exposure

>> Redness. Pain.

Ingestion Exposure

>> Abdominal pain. Further see Inhalation.

>> irritation eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weak; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)

Target Organs:

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

>> Neurological (Nervous System), Respiratory (From the Nose to the Lungs)

>> Nervous

Adverse Effects:

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

>> Neurotoxin - Acute solvent syndrome

Toxicity Data:

>> LC50 (rat) = 77,000 ppm/1 hr

Minimum Risk Level:

The minimal risk level (MRL) is an estimate of the amount of a chemical a person can eat, drink, or breathe each day without a detectable risk to health

>> Chronic Inhalation: 0.6 ppm (L134)

Interactions:

>> To study the protective effects of garlic oil (GO) on the peripheral nerve injuries induced by n-hexane. Male Wistar rats were randomly divided into four groups (10 rats in each group): the control, the n-hexane treatment (2000 mg/kg), the low dose GO, and the high dose GO groups. The rats in the low and high doses of GO groups were pretreated with GO (40 and 80 mg/kg) before exposure to n-hexane (2000 mg/ kg), while the animals of the n-hexane treatment group were given normal saline and then 2000 mg/ kg n-hexane. The rats were exposed to GO and n-hexane 6 times a week for 10 weeks. The gait scores and staying time on the rotating rod for all rats were detected every two weeks. The rats were sacrificed at the end of ten weeks, then the levels of alcohol dehydrogenase (ADH), maleic dialdehyde (MDA), reduced glutathione (GSH), glutathione peroxidase (GSH-Px), total antioxidation capacity (T-AOC) and the ability of inhibition of OH in livers were examined. The gait scores increased significantly and the time staying on the rotating rod obviously decreased in rats of n-hexane treatment group, as compared with control group ($P < 0.05$ or $P < 0.01$). In the hepatic tissues of n-hexane group, the levels of MDA and ADH significantly increased, the activities of GSH-Px, T-AOC and the ability of inhibition of OH obviously decreased, as compared to control group ($P < 0.05$ or $P < 0.01$). In 2 GO groups, the gait scores and the staying time on the rotating rod were significantly improved, the levels of MDA and ADH significantly decreased, the activities of GSH-Px, T-AOC and the ability of inhibition of OH obviously increased, as

compared with n-hexane group ($P < 0.05$ or $P < 0.01$). ADH could play an important role in the protective effects induced by garlic oil on the peripheral nerve injuries produced by n-hexane.

Antidote and Emergency Treatment:

>> Ingestion: Do not induce vomiting. Skin or eyes: Wipe off; wash skin with soap and water; wash eyes with copious amounts of water.

Human Toxicity Excerpts:

>> /HUMAN EXPOSURE STUDIES/ ... The study involved 26 workers diagnosed as having polyneuropathy following n-hexane exposure. The FM-100 Hue test was used to determine color discrimination in study volunteers. Their results were compared with a control group of 50 people who had not been exposed to n-hexane. The mean total error score for the exposed group was 168.3 (SD = 70.5) for the right eye and 181.5 (SD = 103.0) for the left eye. The mean total error scores for the control group for the right and left eyes were 36.0 (SD = 19.8) and 35.6 (SD = 18.2), respectively. Differences between total and partial error scores for exposed and control groups were statistically significant ($P < 0.001$). These results may indicate a relationship between n-hexane exposure and development of defects in color vision, and would support a recommendation for periodic assessment of workers exposed to n-hexane and chemically related solvents.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ Hexane is three times as acutely toxic to mice as is pentane; concentrations of 30,000 ppm produced... /CNS depression/ within 30-60 min, and convulsions and death resulted from inhalation of 34,000-42,000 ppm.

Non-Human Toxicity Values:

>> LD50 Mouse oral 5000 mg/kg bw

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.

>> ... The significant opportunity for women of child-bearing age to be exposed to this chemical prompted the undertaking of a study to assess the developmental toxicity of n-hexane in an animal model. Timed-pregnant (30 animals/group) & virgin (10 animals/group) Sprague-Dawley rats were exposed to 0 (filtered air), 200, 1,000, & 5,000 ppm n-hexane (99.9% purity) vapor in inhalation chambers for 20 hrs/day for a period of 14 consecutive days. Sperm-positive females were exposed for 6-19 days of gestation (dg) & virgins were exposed concurrently for 14 consecutive days. The day of sperm detection was designated as 0 days of gestation for mated females. Adult female body weights were monitored prior to, throughout the exposure period, & at sacrifice. Uterine, placental, & fetal body weights were obtained for gravid females at sacrifice. Implants were enumerated & their status recorded as live fetus, early or late resorption, or dead. Live fetuses were sexed & examined for gross, visceral, skeletal, & soft-tissue craniofacial defects. Maternal toxicity manifested as a reduction in extra-gestational maternal weight gain was observed at all exposure levels, & was statistically significant for the 5,000 ppm exposure group. Extra-gestational maternal weight gain (calculated from 0 days of gestation to 20 days of gestation) relative to control animals was reduced by 20, 23, & 45% for the 200, 1,000, & 5,000 ppm exposure groups, respectively. Cumulative weight gain (CWG) for dams in the 1,000 & 5,000 ppm exposure groups was significantly reduced with respect to controls by 20 days of gestation. The CWG for the 5,000 ppm was also significantly reduced with respect to controls by 13 days of gestation. Comparison of n-hexane exposed groups with the control group (0 ppm) indicated that gestational exposure to n-hexane did not result in an incr in the incidence of intrauterine deaths or in the incidence of fetal malformations. A statistically significant reduction in fetal body weight relative to controls was observed for males at the 1,000 & 5,000 ppm exposure levels (7 & 15% reduction, respectively). Female weights were also reduced with respect to controls for these exposure levels (3 & 14% reduction, respectively), but the reduction was statistically significant for only the 5,000 ppm group. Gravid uterine weight was also significantly less than controls for the 5,000 ppm exposure groups. A statistically significant incr in the mean % incidence/litter of reduced ossification of sternebrae 1-4 was observed for the 5,000 ppm group, & was positively correlated with exposure concn. This increased incidence of reduced ossification in the sternebrae, & the reduction in fetal body weight at the 5,000 ppm level, may have been inter-related manifestations of a slight growth retardation. No major abnormalities were found in any of the fetuses. Variations observed included dilated ureter, renal pelvic cavitation, supernumerary ribs, & reduced skeletal ossifications at several sites. The incr in mean % incidence/litter of reduced ossification of sternebrae 1-4 was statistically significant for the highest exposure concn, & the incr was positively correlated with increasing exposure concn. The lowest n-hexane exposure concn, 200 ppm, proved to be a no observable effect level for developmental toxicity.

TSCA Test Submissions:

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

>> Chronic toxicity was evaluated in male and female Sprague Dawley rats (6/sex/group) exposed to n-hexane via inhalation at 0, 6, 26 and 129 ppm for 6 hrs/day, 5 days/week for 6 months. There were significant differences between treated and control animals in the following: body weights (increased for males at 26 ppm), hemoglobin levels (decreased in all treated females), hematocrit levels (in females, decreased at 6 and 26 ppm, increased at 129 ppm), erythrocyte counts (decreased in all treated females at 3 months), clotting time (increased for females at 6 ppm at 3 months), and mean fasting glucose levels (increased in males at 129 ppm). All but the first and last observations appeared to be within normal biological limits and some were noted only at 3 months, suggesting that the effects were not treatment related.

Populations at Special Risk:

>> Populations at risk are "glue sniffers" ... where hexane is employed as a glue solvent.

12. Ecological Information

Resident Soil (mg/kg)

>> 6.10e+02

Industrial Soil (mg/kg)

>> 2.50e+03

Resident Air (ug/m3)

>> 7.30e+02

Industrial Air (ug/m3)

>> 3.10e+03

Tapwater (ug/L)

>> 1.50e+03

MCL (ug/L)

>> 5.00e+01

Risk-based SSL (mg/kg)

>> 1.00e+01

Chronic Inhalation Reference Concentration (mg/m3)

>> 7.00e-01

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Soil Saturation Concentration (mg/kg)

>> 1.41e+02

ICSC Environmental Data:

>> The substance is toxic to aquatic organisms.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SOIL: n-Hexane was identified, not quantified, in the soil surrounding an earthen disposal pit in the Duncan Oil Field, NM(1).

13. Disposal Considerations

Spillage Disposal

>> Consult an expert! Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Remove all ignition sources. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. 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 harm/injury/toxicity 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 and plant life; and conformance with environmental and public health regulations.

>> Hexane may be disposed of by atomizing in a suitable combustion chamber.

>> Spray into the furnace. Incineration will become easier by mixing with a more flammable solvent. Recommendable methods: Incineration, open burning, use as a boiler fuel, & evaporation. Not recommendable method: Landfill. Peer review: Care. Highly flammable. Evaporate only small amt. (Peer-review conclusions of an IRPTC expert consultation (May 1985))

>> The International Register of Potentially Toxic Chemicals recommends: "Incineration, open burning, use as a boiler fuel, evaporation. Spray into the furnace. Incineration will become easier by mixing with a more flammable solvent. Care, highly inflammable, evaporate only small amounts. Landfill is not recommended".

>> 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.

14. Transport Information

DOT

n-Hexane
3
UN Pack Group: II
Reportable Quantity of 5000 lb or 2270 kg

IATA

n-Hexane
3,
UN Pack Group: II

15. Regulatory Information

State Drinking Water Standards:

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

>> (NJ) NEW JERSEY 30 ug/L

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Hexane

The Australian Inventory of Industrial Chemicals

>> Chemical: Hexane, branched and linear

REACH Registered Substance

>> Status: Active Update: 03-11-2022 https://echa.europa.eu/registration-dossier/-/registered-dossier/15741

New Zealand EPA Inventory of Chemical Status

>> Hexane: HSNO Approval: HSR001166 Approved with controls

New Zealand EPA Inventory of Chemical Status

>> Hexane, branched and linear: Does not have an individual approval but may be used as a component in a product covered by a group standard. It is not approved for use as a chemical in its own right.

16. Other Information

Other Safety Information

Chemical Assessment

>> IMAP assessments - n-Hexane: 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."