Product Stewardship Summary

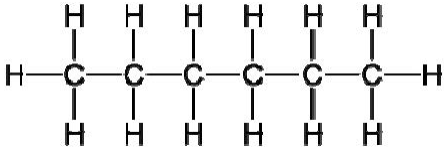
Hexane

General Statement

Hexane is a chemical primarily distilled from oil, and used as a solvent in several specialized applications. At room temperature, it is a colorless, flammable liquid which will quickly evaporate. Consumer exposure to hexane is primarily from gasoline fumes, though some specialized adhesives may also contain hexane.

Chemical Identity

Name: Hexane
Brand Names: some products in the Aroset™, Plioseal™, and Pliobond™ lines
Chemical name (IUPAC): n-hexane
CAS number(s): 110-54-3
ES number: 203-777-6
Molecular formula: C6H14
Structure:



Uses and Applications

Hexane is used to extract edible oils from seeds and vegetables, as a special-use solvent, and as a cleaning agent. It is used in the formulation of glues for shoes, leather products, and roofing. Ashland uses hexane as a solvent in various adhesives and primers.

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Physical/Chemical Properties

Phys/Chem Safety Assessment

Property	Value
Form	Colorless liquid
Physical state	Liquid
Color	Colorless
Odor	Slightly disagreeable. Odor threshold of 130 ppm
Density	0.6606 g/cm^3@ 25°C
Melting / boiling point	-95.35°C / 68.73°C
Flammability	H225: Highly flammable liquid and vapor
Explosive properties	Not explosive
Self-ignition temperature	225°C
Vapor pressure	10 kPa @ 9.8°C
Mol weight	86.17 g/mol
Water solubility	9.8 g/L @ 25°C
Flash point	-22°C @ 101.3 kPa
Octanol-water partition coefficient (Logk_{ow})	4 @ 20°C

Exposure, Hazard and Safety Assessment

The following section describes possible exposures scenarios and hazards associated with hexane. The exposure assessment describes both the amount of and the frequency with which a chemical substance reaches a person, a population of people, or the environment. Hazard refers to the inherent properties of a substance that make it capable of causing harm to human health or the environment. The safety assessment reports the possibility of a harmful event arising from exposure to a chemical or physical agent under specific conditions. Just because a substance may possess potentially harmful properties does not mean that it automatically poses a risk. It is not possible to make that determination without understanding the exposure.

Human Health Effects

Human Exposure Assessment

Consumer: Consumer exposure to hexane is possible from the use of specialty adhesives for shoes, leather products, and roofing applications. As hexane is a part of gasoline, nearly everyone is exposed to small amounts of hexane in air. When used as directed in a well-ventilated area, consumer exposure to hexane from these adhesives is not anticipated to be harmful.

Worker: Exposure to hexane in an industrial setting primarily presents an inhalation concern. While hexane is irritating to the skin, its primary toxic effect is on the nervous system. When working with appropriate precautions, employees are not expected to be exposed to unsafe levels of hexane. Workers should be alert for signs of neurological impairment when working around hexane vapors.

Human Hazard Assessment

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	H304: May be fatal if swallowed and enters airways H336: May cause drowsiness or dizziness
Irritation / corrosion Skin / eye / respiratory test	H315: Causes skin irritation
Sensitization	Not classified
Toxicity after repeated exposure Oral / inhalation / dermal	H373: May cause damage to nervous system through prolonged or repeated exposure
Genotoxicity / Mutagenicity	Does not affect genetic system
Carcinogenicity	Not considered as a carcinogen
Reproductive / Developmental Toxicity	H361: Suspected of damaging fertility or the unborn child
Aspiration hazard	Not applicable

Human Health Safety Assessment

Consumer: Consumers are primarily exposed to hexane through inhalation of products using hexane as a volatile solvent, as well as from gasoline fumes. When used as directed in a well-ventilated area, consumer exposure to hexane from these adhesives is not anticipated to be harmful. Use of hexane-containing products in an unventilated area may lead to neurological impairment including giddiness, dizziness, nausea, and headache. Hexane may also cause lung damage if it is swallowed and enters the airways.

Worker: Exposure to hexane in an industrial setting primarily presents an inhalation concern. While hexane is irritating to the skin, its primary toxic effect is on the nervous system. At high concentrations, hexane inhalation has been linked to reduced sperm count and developmental defects in rats. Failure to use adequate ventilation may result in neurological impairment. Long term exposure to elevated concentrations of hexane can cause peripheral nervous damage, leading to impairment of arm and leg functions. These symptoms typically subside within 6-12 months but is severe cases may be permanent.

Environmental Effects

Environmental Exposures

As hexane rapidly evaporates and is poorly soluble in water, it presents little danger of environmental harm. In the case of an aquatic spill, hexane will mostly float to the surface where it will evaporate. In the case of soil contamination, little hexane will remain in the soil, and the majority will evaporate.

Environmental Hazard Assessment:

Effect Assessment	Result
Aquatic toxicity	H411: Toxic to aquatic life with long lasting effects

Fate and behavior	Result
Biodegradation	Readily biodegradable
Bioaccumulation potential	Moderate potential to bioaccumulate
PBT / vPvB conclusion	This substance is not considered to be persistent, bioaccumulating and toxic (PBT) or very persistent and very bioaccumulating (vPvB)

Environmental Safety Assessment

When released into the environment, hexane rapidly evaporates, and does not remain in soil or water in high concentrations. The hexane vapor will react in the atmosphere with a half life of a few days. As hexane is not expected to persist in the environment, only acute exposures will potentially cause environmental harm.

Risk Management Recommendations

When working with hexane, it is essential to ensure proper ventilation. If any signs of neurological impairment are noted, workers should evacuate the area as soon as they may safely do so. As hexane is flammable above -22 °C, care should be taken to prevent contact with any ignition sources. As hexane vapors are also flammable, even distant ignition sources may be dangerous. Hexane containers should be bonded and grounded to avoid static discharge.
Exposure to hexane in the workplace is covered by established exposure limits. A partial list of references follows:
US OSHA PEL: 500 ppm (8h TWA)
ACGIH TLV: 50 ppm (8h TWA)
EU and member states: http://osha.europa.eu/en/topics/ds/oel/index.stm/members.stm
China: 100 mg/m3 (8h TWA)

Regulatory Agency Review

Hexane:

- is on the list of REACH Registered substances ((EC) 1907/2006)
- is on the US TSCA inventory
- is on the CERCLA list with a RQ of 5000 lbs (2270 kg)
- is listed as a hazardous air pollutant (HAP) under the US Clean Air Act
- is listed on Canada's DSL list
- is listed on the Canadian Ingredient Disclosure List
- is an OECD HPV chemical
- is on the ICCA HPV list
- is on the Australia Index of Chemical Substances
- is on the China Inventory of Existing Chemical Substances
- is on the Japan Inventory of Existing and New Chemical Substances
- is on the Korea Existing Chemicals Inventory
- is on the New Zealand Inventory of Chemicals
- is on the Philippines Inventory of Chemicals and Chemical Substances

Regulatory Information / Classification and Labeling

Under the Globally Harmonized System for classification and labeling (GHS), substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the (Extended) SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals

in use.

GHS Classification:

Flammable liquids: Category 2
Skin corrosion/irritation: Category 2
Reproductive toxicity: Category 2
Specific target organ toxicity (single exposure): Category 3 (central nervous system)
Specific target organ toxicity (repeated exposure): Category 1 (inhalation - nervous system)
Aspiration hazard: Category 1
Aquatic acute toxicity: Category 2
Aquatic chronic toxicity: Category 2

Hazard Statements:

H225: Highly flammable liquid and vapor
H304: May be fatal if swallowed and enters airways
H315: Causes skin irritation
H336: May cause drowsiness or dizziness
H361: Suspected of damaging fertility or the unborn child
H373: May cause damage to nervous system through prolonged or repeated exposure
H411: Toxic to aquatic life with long lasting effects

Signal Word:

Danger

Precautionary Statements:

P102: Keep out of the reach of children
P103: Read label before use
P210: Keep away from heat/sparks/open flames/.../hot surfaces. ... No smoking
P241: Use explosion-proof electrical/ventilating/lighting/.../equipment
P243: Take precautionary measures against static discharge
P260: Do not breathe dust/fume/gas/mist/vapors/spray
P271: Use only outdoors or in a well-ventilated area
P273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection

Hazard Pictograms:

Conclusion

When handled responsibly, hexane helps to safely enhance the properties of several professional and consumer products. Emissions to air and water should be minimized, and spills meeting local reporting requirements should be promptly communicated to appropriate authorities. When working with hexane, proper ventilation is essential to safe handling.

Contact Information with Company

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Additional Information

For more information on GHS, visit http://www.osha.gov/dsg/hazcom/ghsguideoct05.pdf or http://live.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html.
Ashland product stewardship summaries are located at http://www.ashland.com/sustainability/product/product-stewardship

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