

Product Stewardship Summary

Heptane

General Statement

Heptane 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 heptane is primarily from gasoline fumes, though some specialized adhesives and automobile cleaning products may also contain heptane.

Chemical Identity

Name: Heptane

Brand Names: some products in the Aroset™, Pliobond™, Plioseal™, and in the Valvoline™ family of brands

Chemical name (IUPAC): n-heptane

CAS number(s): 142-82-5

ES number: 205-563-8

Molecular formula: C₇H₁₆

Structure:



Uses and Applications

Heptane is used in a number of laboratory and manufacturing applications. Ashland uses heptane as a solvent in various adhesives and primers, as well as in several automobile cleaning products.



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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 150 ppm
Density	0.68 g/cm ³ @ 25°C
Melting / boiling point	-90.61°C / 98.42°C
Flammability	H225: Highly flammable liquid and vapor
Explosive properties	Not explosive
Self-ignition temperature	204°C
Vapor pressure	6.09 kPa @ 25°C
Mol weight	100.21 g/mol
Water solubility	2.4 mg/L @ 25°C
Flash point	-4°C @ 101.3 kPa
Octanol-water partition coefficient (Log _{k_{ow}})	4.5

Exposure, Hazard and Safety Assessment

The following section describes possible exposures scenarios and hazards associated with heptane. 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 heptane is possible from the use of paints and coatings, adhesives, and breathing gasoline fumes. When used in a well-ventilated area, consumer exposure to heptane-containing products is not anticipated to be harmful. As n-heptane is a part of gasoline, nearly everyone is exposed to small amounts in air.

Worker: Exposure to heptane in an industrial setting primarily presents an inhalation concern. When working with appropriate precautions, employees are not expected to be exposed to unsafe levels of heptane. Workers should be alert for signs of neurological impairment when working around heptane vapors. Proper ventilation is essential to minimizing the risks of working with heptane.

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	Not classified
Genotoxicity / Mutagenicity	Does not affect genetic system
Carcinogenicity	Not considered as a carcinogen
Reproductive / Developmental Toxicity	Not classified
Aspiration hazard	Not applicable

Human Health Safety Assessment

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

Worker: Exposure to heptane in an industrial setting primarily presents an inhalation concern. While heptane is irritating to the skin, its primary toxic effect is on the nervous system. Failure to use adequate ventilation may result in neurological impairment.

Environmental Effects

Environmental Exposures

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

Environmental Hazard Assessment:

Effect Assessment	Result
Aquatic toxicity	H400: Very 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, heptane rapidly evaporates, and does not remain in soil or water in high concentrations. The heptane vapor will react in the atmosphere with a predicted half life of less than two days. As heptane is not expected to persist in the environment, only acute exposures will potentially cause environmental harm.

Risk Management Recommendations

When working with heptane, 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 heptane is flammable above -4 °C, care should be taken to prevent contact with any ignition sources. As heptane vapors are also flammable, even distant ignition sources may be dangerous. Heptane containers should be bonded and grounded to avoid static discharge.

Exposure to heptane in the workplace is covered by established exposure limits. A partial list of references follows:

US OSHA PEL: 500 ppm (8h TWA)

ACGIH TLV: 400 ppm (8h TWA)

EU and member states: <http://osha.europa.eu/en/topics/ds/oel/index.stm/members.stm>

Regulatory Agency Review

Heptane:

- is on the list of REACH Registered substances ((EC) 1907/2006)
- is on the US TSCA inventory
- 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 Inventory of Chemical Substances
- is on the China Inventory of Existing Chemical Substances
- is on the Japan Inventory of New and Existing 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

Aspiration hazard – Category 1

Skin corrosion/irritation - Category 2

Specific target organ toxicity - single exposure - Category 3 (Inhalation - central nervous system)

Aquatic chronic toxicity - Category 1

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

H410: Very toxic to aquatic life with long lasting effects

Signal Word:

Danger

Precautionary Statements:

P102: Keep out of the reach of children

P273: Avoid release to the environment

P210: Keep away from heat/sparks/open flames/.../hot surfaces. ... No smoking

P280: Wear protective gloves/protective clothing/eye protection/face protection

P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P331: Do NOT induce vomiting

Hazard Pictograms:



Conclusion

When handled responsibly, heptane 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 heptane, proper ventilation is essential to safe handling.

Contact Information with Company

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Date of Issue: December 15, 2018

Revision: 2

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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REACH registration is specific to Importers/Manufacturers that place the chemical on the EU market, and is specific to registered uses. Inclusion on the list of REACH Registered Substances does not automatically imply registration by Ashland.

Inclusion on the New Zealand Inventory of Chemicals applies only to the pure substance listed. The importer of record must determine whether or not their substances are in compliance.