

Product Safety Summary

Tetrahydrofuran

This Product Safety Summary is intended to provide a general overview of the chemical substance. The information on the Summary is basic information and is not intended to provide emergency response information, medical information or treatment information. The summary should not be used to provide in-depth safety and health information. In-depth safety and health information can be found on the Material Safety Data Sheet (MSDS) for the chemical substance.

Chemical Identity

Abbreviation :	THF
CAS Number :	109-99-9
Common Names :	Tetrahydrofuran THF 1,4-Epoxybutane

Product Overview

- Tetrahydrofuran (THF) is a volatile liquid with good solvent properties for dissolving many organic substances.
- THF is predominantly used to make an intermediate polymer (polyTHF®) that is consumed in the production of spandex fibers used for apparel and hosiery and other elastomers used to produce items such as tires, hoses and tubing. THF is also used as a solvent in the preparation of pharmaceutical products, specialty adhesives, films, printing inks and other coatings.
- When used as a solvent, THF is easily recovered in production processes to prevent pollution and to permit use and re-use.
- Although THF is used in industrial chemical processes, consumers may potentially come into contact with THF through the use of specialty adhesives and coatings containing THF, such as in commercially available products used to join plastic plumbing piping.
- Because THF is reactive with oxygen, it is often sold in a stabilized form to prevent the formation of hazardous peroxides. It is volatile and flammable; care must be taken to avoid its use around sparks, open flames or other sources of ignition.
- The primary potential hazards associated with overexposure to THF include eye and skin irritation on contact and respiratory irritation and central nervous system effects following inhalation of the vapors. The Occupational Safety and Health Administration (OSHA) has established a Permissible Exposure Limit (PEL) of 200 parts of THF per million parts of air (ppm) averaged over an 8 hour work shift. The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) is 50 ppm for 8 hours and 100 ppm for 15 minutes.
- Refer to the current product Material Safety Data Sheet (MSDS) for further safety and health information.

Physical/Chemical Properties

- BASF's product is about 99.9% THF with a small amount of water.
- THF is a clear, colorless liquid which smells like acetone or ether.
- The density of THF, at 0.88 – 0.89 is lower than that of water.

- THF boils at about 151°F, which is below the 212°F boiling temperature for water. THF will evaporate significantly faster than water, which results in potential exposures to vapors.
- THF dissolves a broad range of organic materials.
- The flash point of THF, or minimum temperature at which the vapors form an ignitable mixture, is -7 °F. It is considered flammable.
- The maximum possible airborne concentration at 68 °F is about 511 ppm.

Health Information

Acute Hazards

THF is irritating to the eyes and skin; it may also be irritating to the lining of the respiratory tract. Prolonged skin contact can result in defatting, redness and irritation. Ingestion of tetrahydrofuran or overexposure to its vapors may result in central nervous system (CNS) effects common to many organic solvents such as headaches, nausea, dizziness, and in cases of extreme overexposure, unconsciousness (narcosis).

Effects on Respiratory System:

THF can be detected by most people at levels between 25 and 50 ppm, below the OSHA allowable workplace limit. Irritation has been reported in animals at concentrations between 100 and 200 ppm. Severe overexposures to the vapors may result in CNS effects, such as headaches, nausea and narcosis.

Effects on Eyes:

Contact with the liquid is irritating to the eyes. Exposures to very high vapor concentrations above allowable workplace limits may also cause eye irritation.

Effects on Skin:

Skin contact may cause redness and irritation. THF has a severe irritating effect when it is allowed to evaporate from the skin, due to the defatting action exerted by the solvent.

Effects on Ingestion:

Ingestion may result in severe irritation of the gastrointestinal tract and central nervous system effects. It is considered moderately toxic by ingestion in animals.

Chronic Hazards

In a National Toxicology Program (NTP) lifetime inhalation study, there was evidence of cancer in male rats and female mice. The relevance of these findings to humans is unknown. THF was not carcinogenic to female rats or male mice. The ACGIH has classified THF as an animal carcinogen with unknown relevance to humans.

Environmental Information

Any spill or release to the environment of over 1000 pounds must be reported to the National Response Center (NRC) and the local emergency planning commission as outlined under Emergency Planning and Community Right-to-Know Act (EPCRA) regulations. Each facility handling THF should have a system for dealing with emergencies to limit spills and releases to the environment.

THF must be disposed of in accordance with national, state and local regulations and must not be released into waterways or sewer systems without proper authorization. Unused THF must be disposed of in a licensed facility.

Studies in fish, aquatic invertebrates, aquatic plants and microorganisms indicate that THF is not expected to be harmful to aquatic species.

Additional Hazard Information

Because THF is flammable, care must be taken when handling it to avoid exposure to flames and other sources of ignition.

The following safety recommendations must be observed:

- Store in an area designed for flammable liquids.
- Specify proper electrical equipment and adequate grounding for static electricity.
- Maintain adequate ventilation in all work areas to control to the ACGIH TLV.
- Provide adequate firefighting equipment, including automatic sprinklers, in work and storage areas.

Exposure Potential

Consumers may be exposed to small amounts of THF during the use of some specialty adhesives and coatings containing THF that are sold to the public; however, these potential exposures are expected to be well below the allowable and recommended workplace exposure levels of 200 ppm (OSHA) and 50 ppm (ACGIH) respectively. Workplace exposure must be controlled, by law, to the 200 ppm OSHA PEL. Most production facilities, however, adhere to the stricter limit of 50 ppm recommended by ACGIH.

Workplace exposure should be limited by the use of engineering controls, such as ventilation and hoods. For emergency situations and some specially controlled areas, personal protective equipment, such as respirators, may be employed. In general, skin and eye exposure to organic solvents, such as THF, are prevented through the use of protective eye and face equipment and impermeable gloves and clothing.

The guidelines established by OSHA, ACGIH, NIOSH and others, represent current thinking and are believed to be conservative and protective of occupational workers.

Risk Management

Workers handling THF and consumers using products containing THF can safely work with this material if adequately instructed and educated regarding proper handling procedures.

Workers should be trained to realize that exposure to a hazardous chemical requires immediate washing of affected areas using large amounts of soap and water, and that immediate attention should be obtained in case of exposure. Properly designed emergency showers and eyewash fountains should be placed in convenient locations wherever THF is used. All employees should know the location and operation of this equipment.

Appropriate clothing, gloves, boots and eye protection must be worn when handling THF. Protective clothing should be made of impervious materials and soiled or contaminated clothing should be laundered or destroyed.

Ventilation must be available in work areas to control potential airborne exposures to acceptable levels.

If using a THF-containing product in the home, all instructions and precautions must be read, understood and followed. It should be used only where adequate ventilation exists and must never be used around open flames or other ignition sources.

Federal/Science Findings

U.S Department of Labor – Occupational Safety and Health Administration (OSHA)
http://www.osha.gov/dts/chemicalsampling/data/CH_271000.html
<http://www.osha.gov/SLTC/healthguidelines/tetrahydrofuran/recognition.html>

American Conference of Governmental Industrial Hygienists (ACGIH)
<http://www.acgih.org>

National Institute for Occupational Safety and Health (NIOSH)
<http://www.cdc.gov/niosh/ipcsneng/neng0578.html>

National Library of Medicine/National Institutes of Health
<http://toxnet.nlm.nih.gov/cgi-bin/sis/search/r?dbs+hsdb:@term+@rn+@rel+109-99-9>

Contact Information

<http://www.basf.com>
<http://www.basf.com/chemicalintermediates>

MSDS

http://worldaccount.basf.com/wa/PublicMSDS~en_US/Search

References

Hazardous Substances Data Bank, National Library of Medicine/National Institutes of Health
Tetrahydrofuran (THF) Storage and Handling, BASF Corporation, 1998

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