



American International Chemical, Inc.

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MATERIAL SAFETY DATA SHEET

TETRAHYDROFURAN THFTUL

SECTION 1 - CHEMICAL PRODUCT AND COMPANY INFORMATION

American International Chemical, Inc. 135 Newbury Street Framingham, MA 01701	Emergency Number: Chemtrec Information Number:	800-424-9300 703-527-3887 800-238-0001
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Date: August 2007

Synonyms: THF; 1,4-Epoxybutane; Butylene Oxide, Cyclotetramethylene Oxide

CAS #: 109-99-9

DOT Hazard Class: 3

SECTION 2 - COMPOSITION AND INFORMATION ON INGREDIENTS

100% Tetrahydrofuran

SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Extremely flammable colorless, mobile liquid and vapor. Vapor may cause flash fire. May form explosive peroxides. Harmful if swallowed or inhaled. Causes irritation to skin, eyes and respiratory tract. Affects central nervous system.

POTENTIAL HEALTH EFFECTS:

Skin: Causes irritation to skin. Symptoms include redness, itching and pain.

Eyes: Causes irritation, redness and pain. Contact may cause permanent eye damage.

Inhalation: Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. THF is an anesthetic agent in high concentrations. Overexposure may cause dizziness, headache, nausea and possible fluid in the lungs. May cause liver, kidney or lung injury.

Ingestion: Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. May cause sore throat and abdominal pain. May cause liver or kidney injury.

CARCINOGENICITY: Not Identifiable

Chronic Exposure: Repeated or high exposures may cause kidney or liver damage; may affect the lungs. Repeated skin exposure can cause dryness, cracking of skin and rash.

Aggravation of Pre-existing Conditions: persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

SECTION 4 - FIRST AID MEASURES

Skin: Immediately wash skin with soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse.

Eyes: Immediately flush with plenty of water for at least 15 minutes, holding eyelids apart.

Inhalation: Remove to the fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Ingestion: Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

On All Of The Above: Get medical attention immediately.

SECTION 5 - FIRE FIGHTING MEASURES

Flash Point: -14C (7 °F) Closed Cup

Flammable Limits in air % by volume: lel: 2.0; uel: 11.8

Extinguishing Media: Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool.

Special Fire Fighting Procedures:

Extremely Flammable Liquid and Vapor! Vapor may cause flash fire. Dangerous fire hazard when exposed to heat or flame.

Fire Fighters must wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face-piece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures. Vapors can flow along surfaces to distant ignition source and flash back.

Unusual Fire Explosion Hazard: Above flash point, vapor-air mixtures are explosive within flammable limits noted above. May form explosive organic peroxides when exposed to air or light or with age. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated.

Auto Ignition Temperature: 321 °C (610 °F)

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.

SECTION 7 - HANDLING AND STORAGE

Store in dark glass bottles or steel drums. Protect against physical damage. Store in a cool, dry well-ventilated location, away from direct sunlight and any area where the fire hazard may be acute. Store in tightly closed containers (preferably under nitrogen atmosphere). Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment. Do not use compressed air for filling, discharging, or handling. Peroxides can be removed by treatment with strong ferrous sulfate solution made slightly acidic with sodium bisulfite. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death. Do not allow to evaporate to near dryness unless absence of peroxides has been shown. Addition of appropriate reducing agents will lessen peroxide formation.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

RESPIRATORY PROTECTION: Use NIOSH/MSHA approved respirators.

VENTILATION REQUIREMENTS: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details.

Personal Respirators (NIOSH Approved): If the exposure limit is exceeded, a half-face organic vapor respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

SKIN AND EYE PROTECTION: Use rubber or neoprene gloves, chemical goggles and/or a full face shield where splashing is possible and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure.

WORK, HYGIENIC PRACTICES:

Maintain eye wash fountain and quick-drench facilities in work area. Do not leave food or smoke in work area. Wash thoroughly and remove or clean any contaminated clothing.

EXPOSURE LIMITS: OSHA Permissible Exposure Limit (PEL): 200 ppm (TWA)
ACGIH Threshold Limit Value (TLV): 200 ppm (TWA), 250 ppm (STEL)

Other Control Measures: Odor Threshold: 2-50 ppm

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: 66 °C (151 °F)

Vapor Pressure (MM Hg): 129 @ 20 °C (68 °F)

Vapor Density (AIR=1): 2.5

Specific Gravity (H₂O=1): 0.88 @ 20 °C / 4 °C

Percent Volatile by Volume (% @ 21 °C (68 °F): 100

Melting Point: -108 °C (-162 °F)

Evaporation Rate (Butyl Acetate=1): 8.0

Solubility in Water: Miscible in water.

pH: ca. 7

Odor: Ether odor.

SECTION 10 - STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable in closed containers with oxygen and light excluded. Distillation or evaporation can concentrate peroxides (if present) to create an explosion hazard.

HAZARDOUS POLYMERIZATION: May occur.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide and carbon monoxide may form when heated to decomposition. May also release toxic and irritating vapors.

KEEP AWAY FROM: Heat, flame, ignition sources, incompatibles, light and air. Incompatible with: LiAlH₂, strong oxidizers, NaAlH₂ and potassium hydroxide. Will attack some forms of plastics, rubbers and coatings. Tetrahydrofuran reacts violently with air on standing.

SECTION 11 - TOXICOLOGICAL INFORMATION

Toxicological Data: Oral rat LD₅₀: 1650 mg/kg. Inhalation rat LC₅₀: 21,000 ppm/3H. Investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity: Animal data show developmental effects only at exposures levels producing other toxic effects in the adult animal. Animal testing for reproductive effects show no change in reproductive performance.

Carcinogenicity: Under the National Toxicology Program (NTP), the U.S. Public Health Service completed a 2-year (lifetime) inhalation study in rats and mice on Tetrahydrofuran (THF) which suggests that THF is a carcinogen in laboratory animals. There is no data linking THF exposure to cancer in humans. The data shows carcinogenic activity in the liver and kidneys of laboratory animals.

-----\Cancer Lists\-----

Ingredient Known	---NTP Carcinogen---		
	Anticipated	IARC	Category
Tetrahydrofuran (109-99-9)	No	No	None

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Fate: When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material may biodegrade to a moderate extent. This material is not expected to significantly bioaccumulate. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.

Environmental Toxicity: 96-hour LC50, fathead minnows: 2160 mg/L.

SECTION 13 - DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing use or contamination of this product may change the waste management options. Dispose of in accordance with all federal, state and local regulations.

RCRA WASTE #: Not Listed

SECTION 14 - TRANSPORTATION INFORMATION

D.O.T. SHIPPING NAME:.....Tetrahydrofuran

TECHNICAL SHIPPING NAME:.....Tetrahydrofuran

U.N./NUMBER.....UN2056

D.O.T. HAZARD CLASS AND GROUP NUMBER:.....3, PGII.

D.O.T. PLACARD....Flammable.

PRODUCT LABEL..... *Same as D.O.T. Label plus any additional Warning/Safety Information*

OTHER INFORMATION...IMO: Proper Shipping Name: Tetrahydrofuran
Hazard Class: 3.2
UN/NA Number: UN2056
Packing Group: II

SECTION 15 - REGULATORY INFORMATION

-----\Chemical Inventory Status - Part 1\-----

Ingredient	TSCA	EC	Japan	Australia
Tetrahydrofuran (109-99-9)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----Canada--

Ingredient	Korea	DSL	NDSL	Phil.
Tetrahydrofuran (109-99-9)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
Tetrahydrofuran (109-99-9)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	-RCRA-		-TSCA
	CERCLA	261.33	8(d)
Tetrahydrofuran (109-99-9)			

SECTION 15 - REGULATORY INFORMATION Continued:

Tetrahydrofuran (109-99-9) 1000 U213 Yes

Chemical Weapons Convention: No TSCA 12(b): Yes CDTA: Yes
SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No
Reactivity: Yes (Pure/Liquid)

Australian Hazchem Code: 2SE
Poison Schedule: No information found.

SECTION 16 - OTHER INFORMATION

NFPA Hazard Ratings: Health – 2 Flammability – 3 Reactivity – 1

Reason for Issue: Changed Date

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