

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
  	<p>Flammable material; avoid heat and sources of ignition. CARCINOGEN. MINIMIZE EXPOSURE. Harmful compound, minimize exposure. Irritating to skin, eyes, and the respiratory system. May form explosive peroxides on prolonged storage. This material is harmful to aquatic organisms. Store in a cool dry place. Refrigerate and vent pressure slowly before opening.</p>	   

Section I. Chemical Product and Company Identification

Chemical Name	Furan (Stabilized with BHT)		
Catalog Number	F0074	Supplier	TCI America 9211 N. Harborage St. Portland OR 1-800-423-8616
Synonym	Divinylene Oxide		
Chemical Formula	C ₄ H ₄ O		
CAS Number	110-00-9	In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
Furan (Stabilized with BHT)	110-00-9	Min. 99.0 (GC)	This chemical is classified as a carcinogen. There is no acceptable exposure limit for a carcinogen.	Rat LC ₅₀ (inhalation) 3398ppm/1H Rat LD ₅₀ (intraperitoneal) 5200µg/kg Mouse LC ₅₀ (inhalation) 120mg/m ³ /1H

Section III. Hazards Identification

Acute Health Effects	Harmful if ingested or inhaled. Minimize exposure to this material. Severe overexposure can result in injury or death. Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	<p>CARCINOGENIC EFFECTS : Carcinogenic by RTECS criteria. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : TUMORIGENIC EFFECTS: Rat TDLo (oral) 1950mg/kg/36 Weeks, intermittent. Toxic Effects: Tumorigenic- Carcinogenic by RTECS criteria. Liver- Tumors. Liver- Angiosarcoma. Rat TDLo (oral) 2060mg/kg/103 Weeks, intermittent. Toxic Effects: Tumorigenic- Carcinogenic by RTECS criteria. Blood- Leukemia. Rat TDLo (oral) 1040mg/kg/2 Years, intermittent. Toxic Effects: Tumorigenic- Carcinogenic by RTECS criteria. Liver- Tumors. Liver- Angiosarcoma. DEVELOPMENTAL TOXICITY REPRODUCTIVE EFFECTS: Rat TDLo (oral) 3900mg/kg, male, 13 Weeks prior to mating . Toxic Effects: Paternal Effects- Testes, epididymis, sperm duct. Maternal Effects- Ovaries, fallopian tubes. Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.</p>

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation	If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.

Continued on Next Page

Emergency phone number (800) 424-9300

(Stabilized with BHT)

Ingestion

INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Section V. Fire and Explosion Data

Flammability	Flammable.	Auto-Ignition	Not available.
Flash Points	-35°C (-31°F).	Flammable Limits	Not available.
Combustion Products	These products are toxic carbon oxides (CO, CO ₂).		
Fire Hazards	Not available.		
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.		
Fire Fighting Media and Instructions	Flammable liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Section VI. Accidental Release Measures

Spill Cleanup Instructions	Flammable liquid. Carcinogenic material. Harmful material. Irritating material. May form explosive peroxides. Harmful to aquatic organisms. Store in a cool dry place. Refrigerate before opening. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal.
----------------------------	---

Section VII. Handling and Storage

Handling and Storage Information	FLAMMABLE. CARCINOGEN. HARMFUL. IRRITANT. MAY FORM EXPLOSIVE PEROXIDES ON PROLONGED STORAGE. HARMFUL TO AQUATIC ORGANISMS. STORE IN A COOL DRY PLACE. REFRIGERATE AND VENT PRESSURE SLOWLY BEFORE OPENING. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. Do not breathe gas/fumes/ vapor/spray. Always store away from incompatible compounds such as oxidizing agents, acids.
----------------------------------	---

Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
	
Exposure Limits	This chemical is classified as a carcinogen. There is no acceptable exposure limit for a carcinogen.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid.	Solubility	Insoluble in water. Freely soluble in alcohol and ether. >10% in: acetone, benzene, ethanol.
Specific Gravity	0.94 (water=1)		
Molecular Weight	68.07	Partition Coefficient	K _{ow} = 1.34
Boiling Point	31 to 33°C (87.8 to 91.4°F)	Vapor Pressure	63.5 kPa (@ 20°C)
Melting Point	-85.6 (-122.1°F)	Vapor Density	2.3 (Air = 1)
Refractive Index	1.4216	Volatility	Not available.
Critical Temperature	Not available.	Odor	Ethereal.
Viscosity	Dynamic: 0.38 cP	Taste	Not available.

Section X. Stability and Reactivity Data

Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	May form explosive peroxides on prolonged storage. Avoid excessive heat and light.
Incompatibilities	Reactive with oxidizing agents, acids.

(Stabilized with BHT)

Section XI. Toxicological Information

RTECS Number	LT8524000
Routes of Exposure	Eye Contact. Ingestion. Inhalation.
Toxicity Data	Rat LC ₅₀ (inhalation) 3398ppm/1H Rat LD ₅₀ (intraperitoneal) 5200µg/kg Mouse LC ₅₀ (inhalation) 120mg/m ³ /1H
Chronic Toxic Effects	CARCINOGENIC EFFECTS : Carcinogenic by RTECS criteria. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : TUMORIGENIC EFFECTS: Rat TDLo (oral) 1950mg/kg/36 Weeks, intermittent. Toxic Effects: Tumorigenic- Carcinogenic by RTECS criteria. Liver- Tumors. Liver- Angiosarcoma. Rat TDLo (oral) 2060mg/kg/103 Weeks, intermittent. Toxic Effects: Tumorigenic- Carcinogenic by RTECS criteria. Blood- Leukemia. Rat TDLo (oral) 1040mg/kg/2 Years, intermittent. Toxic Effects: Tumorigenic- Carcinogenic by RTECS criteria. Liver- Tumors. Liver- Angiosarcoma. DEVELOPMENTAL TOXICITY REPRODUCTIVE EFFECTS : Rat TDLo (oral) 3900mg/kg, male, 13 Weeks prior to mating . Toxic Effects: Paternal Effects- Testes, epididymis, sperm duct. Maternal Effects- Ovaries, fallopian tubes. Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.
Acute Toxic Effects	Harmful if ingested or inhaled. Minimize exposure to this material. Severe overexposure can result in injury or death. Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity	Harmful to aquatic organisms.
Environmental Fate	Furan occurs in oils obtained by the distillation of pine wood containing rosin. Furan has been identified in volatile emissions from sorb trees and is a constituent of tobacco smoke. Furan's production and use in organic synthesis for pyrrole and thiophene, formation of lacquers, and as a solvent for resins, may result in its release to the environment through various waste streams. For example, energy related processes such as oil refining, coal mining, and coal gasification release furan in the effluent, and it is released to air as a gas phase component of cigarette smoke, wood smoke and exhaust gas from diesel and gasoline engines. Furan has been detected in samples of river water, effluents, household waste headspace, ambient air, in food such as roasted filbert, mutton, chicken, beef and mother's milk, and in expired human air. If released to soil, furan should have high mobility. Volatilization of furan may be important from moist and dry soil surfaces given an estimated Henry's Law constant of 5.4X10 ⁻³ atm-cu m/mole and an experimental vapor pressure of 600 mm Hg. According to biodegradation studies conducted in aquifer slurries, biodegradation of furan in soil and water will be slow, except for sulfate-reducing conditions where biodegradation may occur more quickly. If released to water, furan would not adsorb to suspended solids and sediment. Furan would volatilize from water surfaces with estimated half-lives for a model river and model lake of 2.5 hours and 3.3 days, respectively. Experimental BCF values of 0.9-1.5 and <3.2-13 suggest that furan will not bioconcentrate in aquatic organisms. If released to the atmosphere, furan will exist as a vapor. Vapor-phase furan is degraded in the atmosphere by reaction with photochemically produced hydroxyl radicals with an estimated half-life of about 9.5 hours. Particulate-phase furan may be physically removed from the air by wet deposition. The most probable route of exposure to furan by the general population and workers is inhalation. (HSDB)

Section XIII. Disposal Considerations

Waste Disposal	Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.
----------------	---

Section XIV. Transport Information

DOT Classification	CLASS 3: Flammable liquid.
PIN Number	UN2389
Proper Shipping Name	Furan (RQ: 100lbs (45.4kg))
Packing Group (PG)	I
DOT Pictograms	

Continued on Next Page

Emergency phone number (800) 424-9300

(Stabilized with BHT)

Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory (EPA)	This compound is ON the EPA Toxic Substances Control Act (TSCA) inventory list. This product is subject to SARA Section 313 reporting requirements. On EPA IRIS Database.
WHMIS Classification (Canada)	CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
EINECS Number (EEC)	203-727-3
EEC Risk Statements	R10- Flammable. R18- In use, may form flammable/explosive vapor-air mixture. R19- May form explosive peroxides. R20/21/22- Harmful by inhalation, in contact with skin and if swallowed. R36/37/38- Irritating to eyes, respiratory system and skin. R45- May cause cancer. R52- Harmful to aquatic organisms.
Japanese Regulatory Data	Not available.

Section XVI. Other Information

Version 1.0
Validated on 12/15/2003.
Printed 2/18/2005.

Notice to Reader

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.

Printed 2/18/2005.