

# Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
 	Combustible material; avoid heat and sources of ignition. Toxic compound, do not ingest or inhale. Avoid all contact with this material. Irritating to skin, eyes, and the respiratory system. Air sensitive material. Store under nitrogen.	   

## Section I. Chemical Product and Company Identification

Chemical Name	<b>Furfuryl Alcohol</b>		
Catalog Number	F0076	Supplier	TCI America 9211 N. Harborgate St. Portland OR 1-800-423-8616
Synonym	2-Furylcarbinol		
Chemical Formula	C <sub>5</sub> H <sub>6</sub> O <sub>2</sub>		
CAS Number	98-00-0	In case of Emergency Call	<b>Chemtrec®</b> <b>(800) 424-9300 (U.S.)</b> <b>(703) 527-3887 (International)</b>

## Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
Furfuryl Alcohol	98-00-0	Min. 98.0 (GC)	ACGIH TLV-TWA 10ppm; STEL 15ppm (skin) NSHA STANDARD-AIR:TWA 5ppm (20mg/m <sup>3</sup> ) (skin) DTLWS* 3,19,73 OSHA PEL (GEN INDU): 8H TWA 50ppm (200mg <sup>3</sup> ) CFRGBR 29,1910.1000,94 OSHA PEL (CONSTRUC):8H TWA 50ppm (200mg/m <sup>3</sup> ) CFRGBR 29,1926.55,94 OSHA PEL (SHIPYARD):8H TWA 50ppm (200mg/m <sup>3</sup> ) GFRGBR 29,1915.1000,93 OSHA PEL (FED CONT):8H TWA 50ppm (200mg/m <sup>3</sup> )	Mouse LD <sub>50</sub> (oral) 160 mg/kg Rat LD <sub>50</sub> (inhalation) 233 ppm/4H Rat LD <sub>50</sub> (oral) 177 mg/kg Rabbit LD <sub>50</sub> (dermal) 400 mg/kg

## Section III. Hazards Identification

Acute Health Effects	Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness 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	<b>CARCINOGENIC EFFECTS</b> : Not available. <b>MUTAGENIC EFFECTS</b> : Not available. <b>TERATOGENIC EFFECTS</b> : Not available. <b>DEVELOPMENTAL TOXICITY</b> Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

## Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Flush eyes with running water for a minimum of 15 minutes, occasionally lifting the upper and lower eyelids. Seek medical attention. Treat symptomatically and supportively.
Skin Contact	After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. Seek medical attention. Treat symptomatically and supportively. Wash any contaminated clothing before reusing.
Inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. WARNING: It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention and, if possible, show the chemical label. Treat symptomatically and supportively.

Continued on Next Page

Emergency phone number (800) 424-9300

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, administer artificial respiration. 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. Seek immediate medical attention and, if possible, show the chemical label. Treat symptomatically and supportively.

### Section V. Fire and Explosion Data

Flammability	Combustible.	Auto-Ignition	Not available.
Flash Points	64°C (147.2°F).	Flammable Limits	Not available.
Combustion Products	These products are toxic carbon oxides (CO, CO <sub>2</sub> ).		
Fire Hazards	Slightly flammable to flammable in presence of open flames and sparks, of shocks, of heat.		
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. No additional information is available regarding the risks of explosion.		
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemicals, CO <sub>2</sub> , water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet.		

### Section VI. Accidental Release Measures

Spill Cleanup Instructions	Combustible material. Toxic liquid. Irritating liquid. Keep away from heat and sources of ignition. Mechanical exhaust required. Stop leak if without risk. DO NOT get water inside container. DO NOT touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all sources of ignition. Consult federal, state, and/or local authorities for assistance on disposal.
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### Section VII. Handling and Storage

Handling and Storage Information	COMBUSTIBLE. TOXIC. IRRITANT. AIR SENSITIVE. STORE UNDER NITROGEN. Handle with caution and minimize exposure. Keep away from heat and sources of ignition. Mechanical exhaust required. When not in use, tightly seal the container and store in a dry, cool place. Avoid excessive heat and light. DO NOT ingest. Do not breathe gas, fumes, vapor or spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Treat symptomatically and supportively. Avoid contact with skin and eyes. Always store away from incompatible compounds such as oxidizing agents, acids.
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### 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. A MSHA/NIOSH approved respirator must be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. 
Exposure Limits	ACGIH TLV-TWA 10ppm; STEL 15ppm (skin) NSHA STANDARD-AIR:TWA 5ppm (20mg/m <sup>3</sup> ) (skin) DTLWS* 3,19,73 OSHA PEL (GEN INDU): 8H TWA 50ppm (200mg/m <sup>3</sup> ) CFRGBR 29,1910.1000,94 OSHA PEL (CONSTRUC):8H TWA 50ppm (200mg/m <sup>3</sup> ) CFRGBR 29,1926.55,94 OSHA PEL (SHIPYARD):8H TWA 50ppm (200mg/m <sup>3</sup> ) GFRGBR 29,1915.1000,93 OSHA PEL (FED CONT):8H TWA 50ppm (200mg/m <sup>3</sup> )

### Section IX. Physical and Chemical Properties

Physical state @ 20°C	Colorless to pale-yellow liquid.	Solubility	Easily soluble in diethyl ether, alcohol. Soluble in cold water. Miscible with most organic solvents. Miscible with water in all proportions above 21°C, but unstable. Immiscible with most oils. Immiscible with petroleum hydrocarbons.
Specific Gravity	1.13	Partition Coefficient	Not available.
Molecular Weight	98.1	Vapor Pressure	0.5 mm of Hg (@ 20°C)
Boiling Point	170°C (338°F)	Vapor Density	3.37 (Air = 1)
Melting Point	-29°C (-20.2°F)	Volatility	16.3% (w/w).
Refractive Index	1.46868 @ 20°C	Odor	Faint burning odor.
Critical Temperature	Not available.	Taste	Bitter.
Viscosity	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	Air sensitive. Avoid excessive heat and light.
Incompatibilities	Reactive with oxidizing agents, acids, oxygen.

**Section XI. Toxicological Information**

RTECS Number	LU9100000
Routes of Exposure	Eye contact. Inhalation. Ingestion. Skin contact.
Toxicity Data	Mouse LD <sub>50</sub> (oral) 160 mg/kg Rat LD <sub>50</sub> (inhalation) 233 ppm/4H Rat LD <sub>50</sub> (oral) 177 mg/kg Rabbit LD <sub>50</sub> (dermal) 400 mg/kg
Chronic Toxic Effects	<b>CARCINOGENIC EFFECTS</b> : Not available. <b>MUTAGENIC EFFECTS</b> : Not available. <b>TERATOGENIC EFFECTS</b> : Not available. <b>DEVELOPMENTAL TOXICITY</b> Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Acute Toxic Effects	Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness 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	Not available.
Environmental Fate	Furfuryl alcohol may be released to the environment as a result of its manufacture and use as a solvent for dyes and resins, as a flavoring agent and other uses. Furfuryl alcohol has been qualitatively detected in the mixture of volatiles from numerous foods, which suggests that the compound may be formed naturally. If released to soil, it will be expected to exhibit very high mobility, based upon the reported infinite solubility of the compound in water and an estimated Koc of 34. It may, therefore, leach through soil to groundwater if it does not biodegrade or otherwise decompose first. It may be subject to biodegradation in soil based upon results observed in a laboratory aqueous aerobic biodegradation screening test. It should not be subject to volatilization from moist near surface soil based upon an estimated Henry's Law constant of 7.86X10 <sup>-8</sup> atm-cu m/mole calculated from the water solubility and vapor pressure. However, it may volatilize from dry near surface soil and other dry surfaces based upon its vapor pressure. If released to water, it will not be expected to adsorb to sediment or suspended particulate matter or to bioconcentrate in aquatic organisms based upon its estimated Koc and BCF, respectively and its high solubility in water. It may directly photolyze in surface water based upon its absorption of light at wavelengths >290 nm. It may be subject to biodegradation in natural waters based upon results observed in a laboratory biodegradation aqueous aerobic screening test using a rigorous activated sludge inoculum. It should not be subject to volatilization from surface waters based upon the estimated Henry's Law constant. If furfuryl alcohol is released to the atmosphere, it can be expected to exist mainly in the vapor-phase in the ambient atmosphere based upon its vapor pressure. The estimated atmospheric half-life for vapor-phase reaction with photochemically produced hydroxyl radicals half-life is 3.7 hr at an atmospheric concentration of 5X10 <sup>5</sup> hydroxyl radicals per cu cm. Furfuryl alcohol may be susceptible to direct photolysis in the atmosphere. Exposure to furfuryl alcohol will occur via ingestion of contaminated foods and human mother's milk. Minor exposure might occur via inhalation of air contaminated with the volatiles from certain foods which contain the compound, especially during cooking of the foods. (HSDB)

**Section XIII. Disposal Considerations**

Waste Disposal	Recycle to process, if possible. Consult your local or 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 this substance.
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**Section XIV. Transport Information**

DOT Classification	DOT CLASS 6.1: Toxic material.
PIN Number	UN2874
Proper Shipping Name	Furfuryl alcohol
Packing Group (PG)	III
DOT Pictograms	

**Section XV. Other Regulatory Information and Pictograms**

TSCA Chemical Inventory (EPA)	This compound is <b>ON</b> the EPA Toxic Substances Control Act (TSCA) inventory list.
WHMIS Classification (Canada)	WHMIS CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). WHMIS CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). WHMIS CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
EINECS Number (EEC)	202-626-1
EEC Risk Statements	R28- Very toxic if swallowed. R36/37/38- Irritating to eyes, respiratory system and skin. R23/24/25- Toxic by inhalation, in contact with skin and if swallowed.
Japanese Regulatory Data	Not available.

**Section XVI. Other Information****Version 1.0****Validated on 11/19/1997.****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, household, 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.