



## MATERIAL SAFETY DATA SHEET

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### 1. PRODUCT IDENTIFICATION

**Synonyms:** 2-Furaldehyde; 2-Furanaldehyde; Furfurool; Furfuraldehyde; Fural; 2-Furancarboxaldehyde  
**CAS No.:** 98-01-1  
**Molecular Weight:** 96.09  
**Chemical Formula:** C<sub>5</sub>H<sub>4</sub>O<sub>2</sub>  
**Product Codes:** F035

### 2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS No	Percent	Hazardous
Furfural	98-01-1	98 - 100%	Yes

### 3. HAZARDS IDENTIFICATION

#### Emergency Overview

DANGER! POISON LIQUID. MAY BE FATAL IF SWALLOWED OR INHALED. HARMFUL IF ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM. FLAMMABLE LIQUID AND VAPOR. MAY CAUSE ALLERGIC SKIN REACTION. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

#### SAF-T-DATA<sup>(tm)</sup> Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)

Flammability Rating: 2 - Moderate

Reactivity Rating: 2 - Moderate

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

#### Potential Health Effects

##### Inhalation:

Causes irritation to the mucous membranes and upper respiratory tract. Symptoms may include sore throat, labored breathing, and headache. Higher concentrations act on the central nervous system and may cause lung congestion. Inhalation may be fatal.

##### Ingestion:

Highly toxic. May cause gastrointestinal disorders. Can cause nerve depression and severe headache. May be fatal. Other effects are not well known.

##### Skin Contact:



Irritant to skin. May cause dermatitis and possibly eczema, allergic sensitization and photosensitization. May be absorbed through the skin with possible systemic effects.

**Eye Contact:**

Vapors irritate the eyes, causing tearing, itching, and redness. Splashes may cause severe irritation or eye damage.

**Chronic Exposure:**

Can cause numbness of the tongue, loss of sense of taste, headache. Other effects are not well-known.

**Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

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#### 4. FIRST AID MEASURES

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**Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**Ingestion:**

If swallowed, give large quantities of water to drink and get medical attention immediately. Never give anything by mouth to an unconscious person.

**Skin Contact:**

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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#### 5. FIRE FIGHTING MEASURES

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**Fire:**

Flash point: 60C (140F) CC

Autoignition temperature: 316C (601F)

Flammable limits in air % by volume:

l<sub>el</sub>: 2.1; u<sub>el</sub>: 19.3

Flammable Liquid and Vapor!

**Explosion:**

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Reacts violently with oxidants. Reacts violently with strong acids and bases causing fire and explosion hazards. Sealed containers may rupture when heated. Sensitive to static discharge.

**Fire Extinguishing Media:**

Water spray, dry chemical, alcohol foam, or carbon dioxide. 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.

**Special Information:**

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained

breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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## 6. ACCIDENTAL RELEASE MEASURES

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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! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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## 7. HANDLING AND STORAGE

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Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. 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, including explosion proof ventilation. 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.

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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### Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):  
5 ppm (TWA) skin

-ACGIH Threshold Limit Value (TLV):  
2 ppm (TWA) skin

### Ventilation System:

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 full facepiece respirator with organic vapor cartridge 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-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

### Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as

appropriate, to prevent skin contact.

**Eye Protection:**

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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**Appearance:** Colorless to yellowish liquid.

**Odor:** Almond odor.

**Solubility:** 8gm/100gm water @ 20C.

**Specific Gravity:** 1.16 @ 25C/4C

**pH:** No information found.

**% Volatiles by volume @ 21C (70F):** 100

**Boiling Point:** 162C (324F)

**Melting Point:** -39C (-38F)

**Vapor Density (Air=1):** 3.3

**Vapor Pressure (mm Hg):** 1 @ 18.5C (64F)

**Evaporation Rate (BuAc=1):** No information found.

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**10. STABILITY AND REACTIVITY**

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**Stability:**

Stable at room temperature in sealed containers. Darkens on exposure to air or light.

**Hazardous Decomposition Products:**

Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:**

Violent polymerization can occur when heated or upon contact with strong mineral acids or alkalis.

**Incompatibilities:**

Strong oxidizers, acids, and alkalis.

**Conditions to Avoid:**

Heat, flames, ignition sources and incompatibles.

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**11. TOXICOLOGICAL INFORMATION**

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Oral rat LD50: 65 mg/Kg. Oral mouse LD50: 400 mg/Kg. Inhalation rat LC50: 175 ppm/6-hour. Irritation data: skin rabbit, standard Draize, 20 mg/24-hour, moderate; eye rabbit, standard Draize, 20 mg/24-hour, moderate. Investigated as a tumorigen and mutagen.

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

---NTP Carcinogen---

Ingredient	Known	Anticipated	IARC Category
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Furfural (98-01-1)	No	No	3
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**12. ECOLOGICAL INFORMATION**

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**Environmental Fate:**

No information found.

**Environmental Toxicity:**

Oral LD50, Redwing Blackbird: 98.0 mg/kg.

**13. DISPOSAL CONSIDERATIONS**

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

**14. TRANSPORT INFORMATION****Domestic (Land, D.O.T.)**

Proper Shipping Name: FURALDEHYDES  
 Hazard Class: 6.1, 3  
 UN/NA: UN1199  
 Packing Group: II  
 Information reported for product/size: 500ML

**International (Water, I.M.O.)**

Proper Shipping Name: FURALDEHYDES  
 Hazard Class: 6.1, 3  
 UN/NA: UN1199  
 Packing Group: II  
 Information reported for product/size: 500ML

**International (Air, I.C.A.O.)**

Proper Shipping Name: FURALDEHYDES  
 Hazard Class: 6.1, 3  
 UN/NA: UN1199  
 Packing Group: II  
 Information reported for product/size: 500ML

**15. REGULATORY INFORMATION**

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

Ingredient	TSCA	EC	Japan	Australia
Furfural (98-01-1)	Yes	Yes	Yes	Yes

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

Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Furfural (98-01-1)	Yes	Yes	No	Yes

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

Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Furfural (98-01-1)	No	No	No	No

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

Ingredient	-RCRA-		-TSCA-
	CERCLA	261.33	8(d)
Furfural (98-01-1)			



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Furfural (98-01-1)                      5000      U125      No

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

**Australian Hazchem Code:** 2W

**Poison Schedule:** None allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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**16. OTHER INFORMATION**  
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**NFPA Ratings:** Health: 3 Flammability: 2 Reactivity: 1

**Label Hazard Warning:**

DANGER! POISON LIQUID. MAY BE FATAL IF SWALLOWED OR INHALED. HARMFUL IF ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM. FLAMMABLE LIQUID AND VAPOR. MAY CAUSE ALLERGIC SKIN REACTION. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

**Label Precautions:**

Keep away from heat, sparks and flame.  
Do not breathe vapor.  
Keep container closed.  
Use only with adequate ventilation.  
Avoid contact with eyes, skin and clothing.  
Wash thoroughly after handling.

**Label First Aid:**

If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.

**Product Use:**

Laboratory Reagent.

**Revision Information:**

MSDS Section(s) changed since last revision of document include: 3, 14.