

Safety Data Sheet

Material Name: Furfuryl Alcohol

SDS ID: ISL-002

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name

Furfuryl Alcohol

Trade Names

2- Furan methanol

Synonyms

Furfural alcohol, Furfuralcohol, 2-Furanmethanol, 2-Furylcarbinol, 2-Furancarbinol, Furan-2-ylmethanol, 2-Furylmethanol, 2-Hydroxymethylfuran

Chemical Family

Alcohols, heterocyclic

Product Use

Solvents for dyes, resins and flavors; flavoring substances; manufacturing wetting agents, resins, polymers; aid in foundry-, dye-, varnish-, plastic- and electric- industry, corrosion-resistant sealants and cements.

Restrictions on Use

None known.

Details of the supplier of the safety data sheet

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Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.

Flammable Liquids - Category 4

Acute Toxicity - Oral - Category 3

Acute Toxicity - Dermal - Category 3

Acute Toxicity - Inhalation - Vapor - Category 2

Skin Corrosion/Irritation - Category 2

Serious Eye Damage/Eye Irritation - Category 2A

Carcinogenicity - Category 2

Specific Target Organ Toxicity - Single Exposure - Category 3

Specific Target Organ Toxicity - Repeated Exposure - Category 1 (respiratory system)

Specific Target Organ Toxicity - Repeated Exposure - Category 2 (central nervous system , kidneys , liver)

Hazardous to the Aquatic Environment - Acute - Category 3

GHS Label Elements

Symbol(s)

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Signal Word

Danger

Hazard Statement(s)

Combustible liquid.
Toxic if swallowed.
Toxic in contact with skin.
Fatal if inhaled.
Causes skin irritation.
Causes serious eye irritation.
Suspected of causing cancer.
May cause respiratory irritation. May cause drowsiness or dizziness.
Causes damage to organs through prolonged or repeated exposure.
May cause damage to organs through prolonged or repeated exposure.
Harmful to aquatic life.

Precautionary Statement(s)

Prevention

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flame/hot surfaces - No smoking.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Do not breathe vapors.
Wear respiratory protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.

Response

In case of fire: Use appropriate media to extinguish.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Immediately call a POISON CENTER or doctor.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
IF ON SKIN: Wash with plenty of soap and water. Take off immediately all contaminated clothing and wash it before reuse.
IF SWALLOWED: Immediately call a POISON CENTER/doctor.
Rinse mouth.

Storage

Store in a well-ventilated place. Keep container tightly closed.
Keep cool.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Other Hazards

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None

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
98-00-0	Furfuryl alcohol	100

Section 4 - FIRST AID MEASURES

Inhalation

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor.

Skin

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Take off contaminated clothing and wash before re-use. If skin irritation occurs, get medical advice/attention.

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth.

Most Important Symptoms/Effects

Acute

Fatal if inhaled. Toxic in contact with skin and if swallowed. Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation. May cause drowsiness or dizziness.

Delayed

Suspected of causing cancer. Causes damage to organs through prolonged or repeated exposure: respiratory system. May cause damage to organs through prolonged or repeated exposure: central nervous system, kidneys, liver.

Indication of any immediate medical attention and special treatment needed

For ingestion, consider gastric lavage and activated charcoal slurry. Treat symptomatically and supportively. For inhalation, consider oxygen.

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

carbon dioxide, regular dry chemical, alcohol-resistant foam, water spray.

Unsuitable Extinguishing Media

Do not use water jets.

Special Hazards Arising from the Chemical

Combustible liquid. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flashback. Containers may rupture or explode.

Hazardous Combustion Products

Fire may produce irritating, poisonous and/or corrosive fumes: carbon monoxide, carbon dioxide, low molecular weight hydrocarbons.

Fire Fighting Measures

Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out.

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure. Use water spray to keep containers cool. Use water spray jet to minimize or disperse vapors.

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Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8. Discard contaminated clothing and footwear. Avoid inhalation of material or combustion by-products. Use extra caution to avoid skin contact, particularly if skin is cut or scratched.

Methods and Materials for Containment and Cleaning Up

Do not attempt to extinguish fire unless flow of material can be stopped first. Eliminate all sources of ignition. Soak up inert absorbent and dispose as waste requiring special attention. Neutralize prior to disposal. Ventilate affected area. Keep unnecessary people away, isolate hazard area and deny entry.

Environmental Precautions

Neutralize prior to disposal. Do not allow to enter ground-water, surface water or drains, even not in small quantities. See Section 13 for Disposal Considerations.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Keep away from heat, sparks, open flame, and hot surfaces - No smoking. Keep container tightly closed. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wash thoroughly after handling. Do not eat, drink, or smoke when using this product. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves/eye protection/face protection.

Conditions for Safe Storage, Including any Incompatibilities

Store in a well-ventilated place. Keep container tightly closed.

Keep cool.

Store locked up.

Store in a cool dry place. Keep separated from incompatible substances. Eliminate all sources of ignition. Store in accordance with all current regulations and standards U.S. OSHA 29 CFR 1910.106. Protect from physical damage.

Incompatible Materials

Strong acid, oxidizing materials, peroxides, metal salts, CYANOACETIC ACID, formic acid, hydrogen peroxide, nitric acid, NITROGEN TETROXIDE, sulfuric acid.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

Furfuryl alcohol	98-00-0
ACGIH:	0.2 ppm TWA
	Skin - potential significant contribution to overall exposure by the cutaneous route
NIOSH:	10 ppm TWA ; 40 mg/m ³ TWA
	15 ppm STEL ; 60 mg/m ³ STEL
	Potential for dermal absorption
	75 ppm IDLH
OSHA (US):	50 ppm TWA ; 200 mg/m ³ TWA

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Mexico:	10 ppm TWA VLE-PPT ; 40 mg/m3 TWA VLE-PPT
	15 ppm STEL [PPT-CT] ; 60 mg/m3 STEL [PPT-CT]
	Skin - potential for cutaneous absorption

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)

There are no biological limit values for any of this product's components.

Engineering Controls

Provide local exhaust or process enclosure ventilation system. Keep good industrial hygiene. Provide an emergency eye wash fountain and quick drench shower in the immediate work area. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment

Eye/face protection

Wear splash resistant safety goggles with a faceshield.

Skin Protection

Wear appropriate chemical resistant clothing.

Respiratory Protection

In case of insufficient ventilation, wear suitable respiratory equipment. The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA. Any air-purifying half-mask respirator equipped with organic vapor cartridge(s) in combination with an N95, R95, or P95 filter.

Glove Recommendations

Wear appropriate chemical resistant gloves.

Protective Materials

Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	clear liquid changes color on exposure to light red to brown	Physical State	Liquid
Odor	Slight ,burning, pungent odor	Color	clear , red , brown
Odor Threshold	Not available	pH	Not available
Melting Point	-14.6 °C	Boiling Point	171 °C
Boiling Point Range	Not available	Freezing point	Not available
Evaporation Rate	Not available	Flammability (solid, gas)	Not available
Autoignition Temperature	490 °C	Flash Point	75 °C [open cup]
Lower Explosive Limit	1.8 %	Decomposition temperature	Not available
Upper Explosive Limit	Not available	Vapor Pressure	0.8117 hPa @ 25 °C

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Vapor Density (air=1)	3.38 (air=1)	Specific Gravity (water=1)	1.13
Water Solubility	very soluble	Partition coefficient: n-octanol/water	Not available
Viscosity	Not available	Kinematic viscosity	Not available
Solubility (Other)	Not available	Density	1.135 g/cm ³ at 20 °C
Physical Form	liquid	Molecular Formula	C ₄ H ₃ O-C-H ₂ -O-H
Molecular Weight	98.09 g/mol	OSHA Flammability Class	Combustible IIIA

Other Information

No information available for the product.

Section 10 - STABILITY AND REACTIVITY

Reactivity

No hazard expected. Avoid contact with incompatible materials.

Chemical Stability

Stable under normal conditions of use.

Possibility of Hazardous Reactions

Hazardous polymerization will not occur.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Avoid contact with incompatible materials.

Incompatible Materials

Incompatible materials: oxidizing materials, strong acids, peroxides, metal salts. Avoid contact with incompatible materials: CYANOACETIC ACID, formic acid, hydrogen peroxide, nitric acid, NITROGEN TETROXIDE, sulfuric acid.

Hazardous decomposition products

Irritating and/or toxic fumes and gases may be emitted upon the product's decomposition: carbon monoxide, carbon dioxide, low molecular weight hydrocarbons.

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Inhalation

Fatal if inhaled. May cause drowsiness and dizziness. High vapor concentrations may produce ocular and respiratory irritation, followed by central nervous system depression and narcosis.

Skin Contact

Toxic in contact with skin. Causes skin irritation.

Eye Contact

Causes eye irritation.

Ingestion

Toxic if swallowed.

Acute and Chronic Toxicity

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Toxic if swallowed. Toxic in contact with skin. Fatal if inhaled. Causes skin irritation. Causes serious eye irritation. Suspected of causing cancer. May cause respiratory irritation. May cause drowsiness or dizziness. Causes damage to organs through prolonged or repeated exposure: respiratory system, central nervous system, kidneys, liver.

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

Furfuryl alcohol (98-00-0)

Oral LD50 Rat 110 mg/kg

Dermal LD50 Rabbit 657 mg/kg

Inhalation LC50 Rat 233 ppm 4 h

Product Toxicity Data

Product Analysis LD/LC 50 Toxicity Values

Oral LD50:	110 mg/kg
Dermal LD50:	657 mg/kg
Inhalation LC50:	233 ppm 4h

Acute Toxicity Estimate

No data available.

Immediate Effects

Fatal if inhaled. Toxic in contact with skin and if swallowed. Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation. May cause drowsiness or dizziness.

Delayed Effects

Suspected of causing cancer. Causes damage to organs through prolonged or repeated exposure: respiratory system. May cause damage to organs through prolonged or repeated exposure; central nervous system, kidneys, liver.

Irritation/Corrosivity Data

Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation.

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Component Carcinogenicity

Furfuryl alcohol	98-00-0
ACGIH:	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC:	Monograph 119 [in preparation] (Group 2B (possibly carcinogenic to humans))
DFG:	Category 3B (could be carcinogenic for man)
OSHA:	Present

Evidence for possible carcinogenic effects in experimental animals existent.

Germ Cell Mutagenicity

Product is mutagenic to bacteria.

Tumorigenic Data

No data available.

Reproductive Toxicity

No data available.

Specific Target Organ Toxicity - Single Exposure

Respiratory system, central nervous system

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Specific Target Organ Toxicity - Repeated Exposure

Respiratory system, kidneys, liver, central nervous system

Aspiration hazard

No data available.

Medical Conditions Aggravated by Exposure

skin disorders and allergies, eye disorders, respiratory disorders

Additional Data

No data available.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity

Harmful to aquatic life.

Product Analysis - Aquatic Toxicity

Fish:	Pimephales promelas (fish) 96 hr 32 mg/l
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Component Analysis - Aquatic Toxicity

Furfuryl alcohol	98-00-0
Fish:	LC50 96 h Pimephales promelas 32 mg/L [static]

Persistence and Degradability

No information available for the product.

Bioaccumulative Potential

No information available for the product.

Mobility

No information available for the product.

Other Toxicity

No information available for product.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of contents/container in accordance with local/regional/national/international regulations. Do not allow to enter into ground-water, surface water or drains.

Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.

Section 14 - TRANSPORT INFORMATION

US DOT Information:

Shipping Name: FURFURYL ALCOHOL

Hazard Class: 6.1

UN/NA #: UN2874

Packing Group: III

Required Label(s): 6.1

TDG Information:

Shipping Name: FURFURYL ALCOHOL

Hazard Class: 6.1

UN#: UN2874

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Packing Group: III

Required Label(s): 6.1

International Bulk Chemical Code

This material contains one or more of the following chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

Furfuryl alcohol	98-00-0
IBC Code:	Category Y

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations

None of this product's components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories

Flammable; Carcinogenicity; Acute toxicity; Skin Corrosion/Irritation; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
Furfuryl alcohol	98-00-0	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer

Furfuryl alcohol	98-00-0
Carc:	carcinogen , 9/30/2016

Canada Regulations

Canadian WHMIS Ingredient Disclosure List (IDL)

Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which meet WHMIS criteria specified in the Controlled Products Regulations and are present above the threshold limits listed on the IDL

Furfuryl alcohol	98-00-0
	1 %

Component Analysis - Inventory

Furfuryl alcohol (98-00-0)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

Section 16 - OTHER INFORMATION

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NFPA Ratings

Health: 3 Fire: 2 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Summary of Changes

New SDS

Preparation Date

October 26, 2015

Revision date

January 10, 2018

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC - European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX - Mexico; Ne- Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL - Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA - Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW - Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

Other Information

Disclaimer:

Supplier gives no warranty whatsoever, including the warranties of merchantability or of fitness for a particular purpose. Any product purchased is sold on the assumption the purchaser shall determine the quality and suitability of the product. Supplier expressly disclaims any and all liability for incidental, consequential or any other damages arising out of the use or misuse of this product. No information provided shall be deemed to be a recommendation to use any product in conflict with any existing patent rights. THIS SDS IS TO BE UTILIZED SOLELY AS A REFERENCE DOCUMENT AND IT IS NOT TO BE USED TO SATISFY THE DISTRIBUTION REQUIREMENTS OF OSHA'S HAZARD COMMUNICATION STANDARD (HCS) NOR CANADA'S CONTROLLED PRODUCT REGULATION (CPR). Read the Safety Data Sheet before handling product. Use of

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any information contained herein is provided at the reader's own risk and thus independent judgment by trained professionals must be utilized at all times..