

Safety Data Sheet

Material Name: Furfural

SDS ID: ISL-001

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name

Furfural

Trade Names

2-Furaldehyde

Synonyms

Furfural; 2-Furaldehyde; Furfuraldehyde; Furale; Furan-2-aldehyde; Furan-2-carbaldehyde; 2-Furancarbal; Furan-2-carboxaldehyde; 2-Formylfuran.

Chemical Family

Aldehyde

Product Use

Solvent for lubricating oil purification, butadiene extraction, crucible manufacture, brake pellets manufacture, grinding wheel manufacture, polymers, diesel tracer, acid resistant coatings, Flavor enhancer.

Restrictions on Use

None known

Details of the supplier of the safety data sheet

Illovo Sugar (South Africa) (Pty) Ltd
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Ridgeside
Umhlanga Rocks
Durban
South Africa
4320

Harborchem
P.O. Box 630
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Phone: (903) 272-7070
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27 48 888

Section 2 - HAZARDS IDENTIFICATION

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

Flammable Liquids - Category 3

Acute Toxicity - Oral - Category 3

Acute Toxicity - Dermal - Category 5

Acute Toxicity - Inhalation - Vapor - Category 3

Skin Corrosion/Irritation - Category 2

Serious Eye Damage/Eye Irritation - Category 2A

STOT SE 3. - Category 3 Respiratory system.

Hazardous to the Aquatic Environment - Acute - Category 3

GHS Label Elements

Symbol(s)



Signal Word

Danger

Hazard Statement(s)

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Flammable liquid and vapor.
Toxic if swallowed.
Toxic if inhaled.
May be harmful in contact with skin.
Causes skin irritation.
Causes serious eye irritation.
May cause respiratory irritation.
Harmful to aquatic life.

Precautionary Statement(s)

Prevention

Keep container tightly closed.
Keep away from heat/sparks/open flame/hot surfaces - No smoking.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Take precautionary measures against static discharge.
Use only non-sparking tools.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Avoid breathing vapor.
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 INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER or doctor/physician.
IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
Call a POISON CENTER or doctor if you feel unwell.
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.
IF SWALLOWED: Immediately call a POISON CENTER/doctor.
Rinse mouth.

Storage

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

Disposal

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

Other Hazards

None.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
98-01-1	Furfural	100

Section 4 - FIRST AID MEASURES

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Inhalation

Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor if you feel unwell.

Skin

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a POISON CENTER or doctor if you feel unwell.

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

Toxic if inhaled. Toxic if swallowed. May be harmful in contact with skin. Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation.

Delayed

No information on significant adverse effects.

Indication of any immediate medical attention and special treatment needed

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

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon dioxide, alcohol resistant foam, regular dry chemical, water spray.

Unsuitable Extinguishing Media

Do not use water jets.

Special Hazards Arising from the Chemical

Flammable liquid and vapor. 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: oxides of carbon, 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.

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. Keep unnecessary people away, isolate hazard area and deny entry.

Environmental Precautions

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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 container tightly closed. Keep away from heat, sparks, open flame, and hot surfaces - No smoking. 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. Avoid breathing vapors. Avoid contact with skin, eyes and clothes. Use only outdoors or in a well-ventilated area. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves/protective clothing/eye protection/face protection.

Conditions for Safe Storage, Including any Incompatibilities

Store locked up.

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

Keep cool.

Keep away from sources of ignition. Protect from physical damage. Keep separated from incompatible substances listed below.

Incompatible Materials

Oxidizing materials, strong acids, bases, mineral acids. Contact with acids and other incompatible materials may result in a violent polymerization reaction creating a fire or explosion hazard.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

Furfural	98-01-1
ACGIH:	0.2 ppm TWA
	Skin - potential significant contribution to overall exposure by the cutaneous route
NIOSH:	100 ppm IDLH
OSHA (US):	5 ppm TWA ; 20 mg/m ³ TWA
	prevent or reduce skin absorption
Mexico:	2 ppm TWA VLE-PPT ; 8 mg/m ³ TWA VLE-PPT
	10 ppm STEL [PPT-CT] ; 40 mg/m ³ STEL [PPT-CT]
	Skin - potential for cutaneous absorption

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

Furfural (98-01-1)

200 mg/l Medium: urine Time: end of shift Parameter: Furoic acid with hydrolysis (nonspecific)

Engineering Controls

Provide local exhaust or process enclosure ventilation system. 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.

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Skin Protection

Wear appropriate chemical resistant clothing.

Respiratory Protection

In case of insufficient ventilation, wear suitable respiratory equipment. Respirators should be selected by and used under the direction of a trained health and safety professional, following requirements found in OSHA's respirator standard (29 CFR 1910.134). A NIOSH approved air-purifying respirator with an appropriate cartridge or canister may be appropriate under certain circumstances where airborne concentrations are expected to exceed exposure limits.

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	Yellow liquid which turns reddish-brown upon exposure to light and air	Physical State	liquid
Odor	almond odor	Color	yellow which turns reddish-brown upon exposure to light and air
Odor Threshold	Not available	pH	Not available
Melting Point	-39 °C	Boiling Point	Not available
Boiling Point Range	162 °C	Freezing point	Not available
Evaporation Rate	Not available	Flammability (solid, gas)	Not available
Autoignition Temperature	316.1 °C	Flash Point	60 °C [Closed cup]
Lower Explosive Limit	2.1 %	Decomposition temperature	Not available
Upper Explosive Limit	19.3 %	Vapor Pressure	Not available
Vapor Density (air=1)	3.3	Specific Gravity (water=1)	1.16
Water Solubility	8.3 g/100 mL	Partition coefficient: n-octanol/water	Not available
Viscosity	Not available	Kinematic viscosity	Not available
Solubility (Other)	Not available	Density	Not available

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Physical Form	liquid	Molecular Weight	96.09
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Other Information

No additional information available for the product.

Section 10 - STABILITY AND REACTIVITY

Reactivity

No hazard expected.

Chemical Stability

Stable under normal conditions of use.

Possibility of Hazardous Reactions

Contact with acids and other incompatible materials may result in a violent polymerization reaction creating a fire or explosion hazard.

Conditions to Avoid

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

Incompatible Materials

Strong acid, oxidizing materials, bases, mineral acids

Hazardous decomposition products

Oxides of carbon, low molecular weight hydrocarbons

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Inhalation

Toxic if inhaled. May cause respiratory irritation.

Skin Contact

Causes skin irritation.

Eye Contact

Causes eye irritation.

Ingestion

Toxic if swallowed.

Acute and Chronic Toxicity

Component Analysis - LD50/LC50

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

Furfural (98-01-1)

Oral LD50 Rat 125 mg/kg

Dermal LD50 Rat >2000 mg/kg

Inhalation LC50 Rat 175 ppm 6 h

Product Toxicity Data

Acute Toxicity Estimate

No data available.

Immediate Effects

Toxic if inhaled. Toxic if swallowed. May be harmful in contact with skin. May cause irritation to respiratory tract.

Causes skin irritation, eye irritation, and respiratory tract irritation.

Delayed Effects

No information on significant adverse effects.

Irritation/Corrosivity Data

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

Respiratory Sensitization

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No data available.

Dermal Sensitization

No data available.

Component Carcinogenicity

Furfural	98-01-1
ACGIH:	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC:	Monograph 63 [1995] (Group 3 (not classifiable))
DFG:	Category 3B (could be carcinogenic for man)

Germ Cell Mutagenicity

No data available.

Tumorigenic Data

No data available.

Reproductive Toxicity

No data available.

Specific Target Organ Toxicity - Single Exposure

Respiratory system.

Specific Target Organ Toxicity - Repeated Exposure

No data available.

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.

Component Analysis - Aquatic Toxicity

Furfural	98-01-1
Fish:	LC50 96 h Pimephales promelas 13.4 - 19.3 mg/L [static]; LC50 96 h Pimephales promelas 16.79 - 26.35 mg/L [flow-through]

Persistence and Degradability

No information available for the product.

Bioaccumulative Potential

No information available for the product.

Mobility

Expected to have high mobility in soil.

Other Toxicity

No information available for the product.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

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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

Furfural	waste number U125 (Ignitable waste)
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Section 14 - TRANSPORT INFORMATION

US DOT Information:

Shipping Name: FURALDEHYDES

Hazard Class: 6.1

UN/NA #: UN1199

Packing Group: II

Required Label(s): 6.1, 3

TDG Information:

Shipping Name: FURALDEHYDES

Hazard Class: 6.1

UN#: UN1199

Packing Group: II

Required Label(s): 6.1, 3

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.

Furfural	98-01-1
IBC Code:	Category Y

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

Furfural	98-01-1
CERCLA:	5000 lb final RQ ; 2270 kg final RQ

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

Flammable; 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
Furfural	98-01-1	Yes	Yes	Yes	Yes	Yes

Not listed under California Proposition 65

Canadian WHMIS Ingredient Disclosure List (IDL)

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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

Furfural	98-01-1
	1 %

Component Analysis - Inventory
Furfural (98-01-1)

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

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

September 23, 2015

Revision date

August 30, 2019

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;

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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 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.