SAFETY DATA SHEET

Preparation Date: 7/16/2015 **Revision Date:** 7/13/2015 **Revision Number:** G1

1. IDENTIFICATION

Product identifier

Product code: F1100
Product Name: FURFURYL ALCOHOL

Other means of identification

Synonyms: 2-Furanmethanol
2-Furylmethanol
2-Furylcarbionol
2-Furancarbionol
Furyl Carbitol
Furfural alcohol
CAS #: 98-00-0
RTECS # LU9100000
CI#: Not available

Recommended use of the chemical and restrictions on use

Recommended use: No information available.
Uses advised against No information available

Supplier: Spectrum Chemical Mfg. Corp
14422 South San Pedro St.
Gardena, CA 90248
(310) 516-8000
Order Online At: https://www.spectrumchemical.com

Emergency telephone number Chemtrec 1-800-424-9300
Contact Person: Martin LaBenz (West Coast)
Contact Person: Ibad Tirmiz (East Coast)

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 3
Acute toxicity - Dermal	Category 3
Acute toxicity - Inhalation (Gases)	Category 2
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Specific target organ toxicity (single exposure)	Category 3
Specific target organ toxicity (repeated exposure)	Category 2
Flammable liquids	Category 4

Label elements

Danger

Hazard statements
Toxic if swallowed
Toxic in contact with skin
Fatal if inhaled
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation. May cause drowsiness or dizziness
May cause damage to organs through prolonged or repeated exposure
Combustible liquid

Hazards not otherwise classified (HNOC)
Not Applicable

Other hazards
Not available

Precautionary Statements - Prevention
Keep away from heat/sparks/open flames/hot surfaces. — No smoking
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Wear respiratory protection
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Wash face, hands and any exposed skin thoroughly after handling

Precautionary Statements - Response
Specific treatment (see .? on this label)
Specific treatment is urgent (see .? on this label)
Specific treatment (see .? on this label)
Get medical advice/attention if you feel unwell
In case of fire: Use CO2, dry chemical, or foam to extinguish.
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 ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. Call a POISON CENTER or doctor/physician if you feel unwell.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth

Precautionary Statements - Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS-No.	Weight %	Trade Secret
Furfuryl Alcohol 98-00-0	98-00-0	100	*

4. FIRST AID MEASURES

First aid measures

General Advice: Poison information centers in each State capital city can provide additional assistance for scheduled poisons (13 1126). Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. First aider needs to protect himself.

Skin Contact: Toxic in contact with skin. Wash off immediately with soap and plenty of water. Continue flushing with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before re-use. Immediate medical attention is required. Call a physician or Poison Control Centre immediately.

Eye Contact: Flush eye with water for 15 minutes. Get medical attention.

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. WARNING! It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled or ingested material is toxic, infectious or corrosive. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion: Toxic if swallowed. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Immediate medical attention is required. Call a physician or Poison Control Center immediately.

Most important symptoms and effects, both acute and delayed

Symptoms Irritating to eyes, respiratory system and skin. Also harmful by inhalation and if swallowed. Severe over-exposure can result in death. Toxic by inhalation, in contact with skin and if swallowed. May cause drowsiness or dizziness.. Ingestion may cause gastrointestinal irritation, nausea, vomiting, and diarrhea. Central nervous system effects. May cause cyanosis. May cause nausea and headache. Ataxia. May cause bronchitis. Weakness. Fatal if inhaled. Toxic if swallowed. Toxic in contact with skin. Causes skin irritation. May cause respiratory irritation . Causes damage to organs through prolonged or repeated exposure.

Indication of any immediate medical attention and special treatment needed

Notes to Physician: Treat symptomatically

Protection of first-aiders
First-Aid Providers: Avoid exposure to blood or body fluids. Wear gloves and other necessary protective clothing. Dispose of contaminated clothing and equipment as bio-hazardous waste

5. FIRE-FIGHTING MEASURES

Extinguishing Media

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media: Do not use a solid (straight) water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Hazardous Combustion Products: Carbon dioxide, Carbon monoxide

Specific hazards: Combustible material
May be ignited by heat, sparks or flames
Container explosion may occur under fire conditions or when heated
Furfuryl alcohol ignites on contact with 85% Hydrogen Peroxide
May have explosive reactions or polymerization with cyanoacetic acid, formic acid, mineral acids, and organic acids
Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks)

Special Protective Actions for Firefighters

Specific Methods: For larger fires, use water spray or fog. Cool containers with flooding quantities of water until well after fire is out. Dike fire-control water for later disposal; do not scatter the material.

Special Protective Equipment for Firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions: Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Evacuate personnel to safe areas. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. All equipment used when handling the product must be grounded.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Prevent entry into waterways, sewers, basements or confined areas. In case of large spill, dike if needed. Dike far ahead of liquid spill for later disposal.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk. Absorb spill with inert material (e.g. vermiculite, dry sand or earth), then place in a suitable chemical waste container. In case of large spill, dike if needed. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up Use appropriate tools to put the spilled material in a suitable chemical waste disposal container. Use only non-sparking tools. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical Measures/Precautions:
Provide sufficient air exchange and/or exhaust in work rooms. All equipment used when handling the product must be grounded. Remove all sources of ignition. Keep away from incompatible materials.

Safe Handling Advice
Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe vapors or spray mist. Do not ingest. Do not smoke. Use only in well-ventilated areas. Keep away from heat and sources of ignition. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Technical Measures/Storage Conditions:
Air sensitive. Sensitive to light. Store in light-resistant containers. Keep container tightly closed in a dry and well-ventilated place. Do not store near combustible materials. Keep away from heat and sources of ignition. Store away from incompatible materials. Store in a segrated and approved area.

Incompatible Materials:
Oxidizing agents. Combustible materials. Acids.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

National occupational exposure limits

United States

Components	OSHA	NIOSH	ACGIH	AIHA WHEEL
Furfuryl Alcohol 98-00-0	50 ppm TWA 200 mg/m^3 TWA	= 40 mg/m^3 TWA	= 15 ppm STEL	None

Canada

Components	Alberta	British Columbia	Ontario	Quebec
Furfuryl Alcohol 98-00-0	= 10 ppm TWA = 40 mg/m^3 TWA	= 5 ppm TWA	10 ppm TWA	10 ppm TWAEV 40 mg/m^3 TWAEV 15 ppm STEV 60 mg/m^3 STEV

Australia and Mexico

Components	Australia	Mexico
Furfuryl Alcohol 98-00-0	60 mg/m^3 STEL 15 ppm STEL 10 ppm TWA 40 mg/m^3 TWA	= 10 ppm TWA = 40 mg/m^3 TWA

Appropriate engineering controls

Engineering measures to reduce exposure: Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Individual protection measures, such as personal protective equipment

Personal Protective Equipment

Eye protection: Goggles

Skin and body protection: Chemical resistant protective suit. Gloves. Boots.

Respiratory protection: Vapor respirator. Be sure to use an approved/certified respirator or equivalent.

Hygiene measures: Avoid contact with skin, eyes and clothing. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:
Liquid

Appearance:
No information available

Color:
Clear. Colorless to pale yellow.

Odor:
Burnt. Slight.

Taste
Bitter.

Molecular/Formula weight:
98.1 g/mol

Formula:
C5H6O2

Flammability:
Combustible

Flash point (°C):
65°C
75°C

Flashpoint (°C/°F):
65°C/ 149°F
75°C/167°F

Flash Point Tested according to:
Closed cup
Open cup

Autoignition Temperature (°C/°F):
490°C/ 914°F

Lower Explosion Limit (%):
1.8%

Upper Explosion Limit (%):
16.3%

pH:
No information available

Melting point/range(°C/°F):
-14°C/6°F

Boiling point/range(°C/°F):
170°C/338°F

Bulk density:
No information available

Decomposition temperature(°C/°F):
No information available

Density (g/cm3):
1.1296

Specific gravity:
No information available

Vapor pressure @ 20°C (kPa):
No information available

Evaporation rate:
No information available

Vapor density:
1.003 (Peer Reviewed; Clayton, G.D. and Clayton, F.E.)
3.38 (NFPA)

VOC content (g/L):
No information available

Odor threshold (ppm):
8 ppm

Partition coefficient (n-octanol/water):
0.3

Viscosity:
No information available

Miscibility:
Miscible with water

Solubility:
Easily soluble in cold water
Easily soluble in diethyl ether
Very soluble in alcohol
Soluble in Benzene
Soluble in Chloroform
Insoluble in hydrocarbons
It is soluble in water, but is unstable in aqueous solutions

10. STABILITY AND REACTIVITY

Reactivity

Reactive with oxidizing agents
Incompatible with combustible materials
Highly reactive with acids
Incompatible with acids (nitric acid, formic acid, cyanoacetic acid), mineral acids, strong oxidizing agents, air, acid chlorides, organic acids, oxygen, fuming nitric acid.
Turns amber due to autooxidation and intramolecular dehydration during storage and turns black in presence of air and light.
It does not react with water or common materials.
Furfuryl is easily resinified by acids

Chemical stability
Stability: Sensitive to air. Sensitive to light. Exposure to light accelerates decomposition.

Possibility of Hazardous Reactions: Hazardous polymerization does not occur

Conditions to avoid: Heat. Ignition sources. Incompatible materials. Exposure to air. Exposure to light.

Incompatible Materials: Oxidizing agents. Combustible materials. Acids.

Hazardous decomposition products: Carbon dioxide. Carbon monoxide.

Other Information
Corrosivity: No information available

Special Remarks on Corrosivity: No information available

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principal Routes of Exposure:
Eyes. Inhalation. Ingestion. Skin.

Acute Toxicity

Component Information

Furfuryl Alcohol - 98-00-0

LD50/oral/rat = 110 mg/kg Oral LD50 Rat
177mg/kg Oral LD50 Rat
LD50/oral/mouse = 160 mg/kg
LD50/dermal/rat = No information available
LD50/dermal/rabbit = 657mg/kgDermal LD50Rabbit
400mg/kg Dermal LD50 Rabbit
LC50/inhalation/rat = 233 ppm Inhalation LC50 Rat 4 h
LC50/inhalation/mouse = No infomation available
Other LD50 or LC50information = No information available

Product Information

LD50/oral/rat =
VALUE- Acute Tox Oral = 110mg/kg

LD50/oral/mouse =
Value - Acute Tox Oral = No information available

LD50/dermal/rabbit
VALUE-Acute Tox Dermal = 400mg/kg

LD50/dermal/rat
VALUE -Acute Tox Dermal = No information available

LC50/inhalation/rat
VALUE-Vapor = 233ppm (4-hr)
VALUE-Gas = No information available
VALUE-Dust/Mist = No information available

LC50/Inhalation/mouse
VALUE-Vapor = No information available
VALUE - Gas = No information available

VALUE - Dust/Mist = No information available
Symptoms

Skin Contact: Toxic in contact with skin. Causes skin irritation.

Eye Contact: Causes serious eye irritation.

Inhalation Fatal if inhaled. Vapor or mist can irritate the respiratory tract (nose, throat and lungs) and mucous membranes. Inhalation may produce severe bronchitis and spasms, coughing and chest pains. May affect brain, blood, behavior/central nervous system causing ataxia, excitement, headache, dizziness, weakness, drowsiness, unconciousness) and gastrointestinal tract (nausea, vomiting). Effects of inhalation may be delayed..

Ingestion Toxic if swallowed. May cause gastrointestinal (digestive) tract irritation with nausea, vomiting, diarrhea. May affect behavior/central nervous system (ataxia). May cause cyanosis. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Effects may be delayed 2 to 4 hours.

Aspiration hazard No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity Chronic exposure may affect the liver and kidneys. Ingestion: Prolonged or repeated ingestion may affect the respiration (respiratory depression, dyspnea).

Sensitization: No information available

Mutagenic Effects: No information available

Carcinogenic effects: May cause cancer based on animal test data.

Components	IARC	ACGIH - Carcinogens	NTP	OSHA HCS - Carcinogens	Australia - Prohibited Carcinogenic Substances	Australia - Notifiable Carcinogenic Substances
Furfuryl Alcohol	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed

Reproductive toxicity No data is available

Reproductive Effects: No information available
Developmental Effects: No information available
Teratogenic Effects: No information available

Specific Target Organ Toxicity

STOT - single exposure central nervous system. Respiratory system.
STOT - repeated exposure liver. kidney. central nervous system. respiratory system.
Target Organs: Central nervous system.

12. ECOLOGICAL INFORMATION

Ecotoxicity

12. ECOLOGICAL INFORMATION

Ecotoxicity effects: May be harmful to the aquatic environment.

Furfuryl Alcohol - 98-00-0
Freshwater Fish Species Data: 32 mg/L LC50 Pimephales promelas 96 h static 1
Water Flea Data: 328 mg/L EC50 Daphnia magna 24 h

Persistence and degradability: No information available

Bioaccumulative potential: No information available

Mobility: No information available

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Waste from residues / unused products:
Waste must be disposed of in accordance with Federal, State and Local regulation. Do not dispose of waste into sewer.

Contaminated packaging:
Empty containers should be taken for local recycling, recovery or waste disposal. Do not re-use empty containers Dispose of as unused product.

Components	RCRA - F Series Wastes	RCRA - K Series Wastes	RCRA - P Series Wastes	RCRA - U Series Wastes
Furfuryl Alcohol	None	None	None	None

14. TRANSPORT INFORMATION

DOT
UN-No: UN2874
Proper Shipping Name: Furfuryl alcohol
Hazard Class: 6.1
Subsidiary Risk:
Packing Group: III
ERG No: 153
Marine Pollutant No data available
DOT RQ (lbs): No information available
Symbol(s):

TDG (Canada)
UN-No: UN2874
Proper Shipping Name: Furfuryl alcohol
Hazard Class: 6.1
Subsidiary Risk: No information available
Packing Group: III
Description: No information available

ADR
UN-No: UN2874
Proper Shipping Name: Furfuryl alcohol

14. TRANSPORT INFORMATION

Hazard Class: 6.1
Packing Group: III
Subsidiary Risk: No information available
Classification Code: No information available
Description: No information available
CEFIC Tremcard No: No information available

IMO / IMDG

UN-No: UN2874
Proper Shipping Name: Furfuryl alcohol
Hazard Class: 6.1
Subsidiary Risk: No information available
Packing Group: III
Description: No information available
IMDG Page: No information available
Marine Pollutant No information available
EMS: F-A
MFAG: No information available
Maximum Quantity: No information available

RID

UN-No: UN2874
Proper Shipping Name: Furfuryl alcohol
Hazard Class: 6.1
Subsidiary Risk: No information available
Packing Group: III
Classification Code: No information available
Description: No information available

ICAO

UN-No: UN2874
Proper Shipping Name: Furfuryl alcohol
Hazard Class: 6.1
Subsidiary Risk: No information available
Packing Group: III
Description: No information available

IATA

UN-No: UN2874
Proper Shipping Name: Furfuryl alcohol
Hazard Class: 6.1
Subsidiary Risk: No information available
Packing Group: III
ERG Code: 6L
Description: No information available

15. REGULATORY INFORMATION

International Inventories

Components	U.S. TSCA	KOREA KECL	Philippines (PICCS)	Japan ENCS	CHINA	Australia (AICS)	EINECS-No.
Furfuryl Alcohol	Present	Present KE-17364	Present	Present (5)-31	Present	Present	Present 202-626-1

U.S. Regulations

Furfuryl Alcohol

Massachusetts RTK: Present
New Jersey RTK Hazardous Substance List: 0954
Pennsylvania RTK: Present
Minnesota - Hazardous Substance List: Present
California Directors List of Hazardous Substances: Present

FDA - 21 CFR - Total Food Additives 175.105

California Prop. 65: Safe Drinking Water and Toxic Enforcement Act of 1986.

Chemicals Known to the State of California to Cause Cancer:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Chemicals Known to the State of California to Cause Reproductive Toxicity:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Components	Carcinogen	Developmental Toxicity	Male Reproductive Toxicity	Female Reproductive Toxicity:
Furfuryl Alcohol	Not Listed	Not Listed	Not Listed	Not Listed

CERCLA/SARA

Components	CERCLA - Hazardous Substances and their Reportable Quantities	Section 302 Extremely Hazardous Substances and TPQs	Section 302 Extremely Hazardous Substances and RQs	Section 313 - Chemical Category	Section 313 - Reporting *de minimis*
Furfuryl Alcohol	None	None	None	None	None

U.S. TSCA

Components	TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)	TSCA 8(d) -Health and Safety Reporting
Furfuryl Alcohol	Not Applicable	Not Applicable

Canada

WHMIS hazard class:
B3 Combustible liquid
D1A Very toxic materials
D2B Toxic materials

Canada Controlled Products Regulation:
This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

Components	WHMIS Ingredient Disclosure List -
Furfuryl Alcohol	1 %

Inventory

Components	Canada (DSL)	Canada (NDSL)
Furfuryl Alcohol	Present	Not Listed

Components	CEPA Schedule I - Toxic Substances	CEPA - 2010 Greenhouse Gases Subject to Manditory Reporting
Furfuryl Alcohol	Not listed	Not listed

EU Classification

R-phrase(s)
R23 - Also toxic by inhalation
R40 - Limited evidence of a carcinogenic effect
R21/22 - Harmful in contact with skin and if swallowed.
R48/20 - Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R36/37 - Irritating to eyes and respiratory system.

S -phrase(s)
S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S63 - In case of accident by inhalation: remove casualty to fresh air and keep at rest.
S 1/2 - Keep locked up and out of the reach of children.
S36/37 - Wear suitable protective clothing and gloves.

Components	Classification	Concentration Limits:	Safety Phrases
Furfuryl Alcohol	Xn; R21/22-48/20 T; R23 Xi; R36/37 Carc.Cat.3; R40	5%<=C: Xn; R20/21/22	S1/2 S36/37 S45 S63

The product is classified in accordance with Annex VI to Directive 67/548/EEC

Indication of danger:
Xi - Irritant.
Xn - Harmful.
T - Toxic

16. OTHER INFORMATION

16. OTHER INFORMATION

Preparation Date: 7/16/2015
Revision Date: 7/13/2015
Prepared by: Sonia Owen

Disclaimer: All chemicals may pose unknown hazards and should be used with caution. This Safety Data Sheet (SDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. The physical properties reported in this SDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.

End of Safety Data Sheet