



MATERIAL SAFETY DATA SHEET

according to the Hazard Communication Standard (29 CFR 1910.1200)

Date of issue: 12/20/2012

Version 1.0

SECTION 1. Identification

Product identifier

Product number	804012
Product name	Furfural for synthesis

Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Chemical for synthesis
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Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation 290 Concord Road, Billerica, MA 01821, United States of America SDS Phone Support: +1-978-715-1335 General Inquiries: +1-978-715-4321 Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) e-mail: mm_sds@merckgroup.com
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Emergency telephone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week
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SECTION 2. Hazards identification

GHS Classification

Flammable liquid, Category 3, H226
Carcinogenicity, Category 2, H351
Acute toxicity, Category 3, Inhalation, H331
Acute toxicity, Category 4, Dermal, H312
Acute toxicity, Category 3, Oral, H301
Eye irritation, Category 2, H319
Specific target organ systemic toxicity - single exposure, Category 3, H335
Skin irritation, Category 2, H315
For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS-Labeling

Hazard pictograms



Signal Word

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Danger

Hazard Statements

H226 Flammable liquid and vapor.
H301 + H331 Toxic if swallowed or if inhaled.
H312 Harmful in contact with skin.
H351 Suspected of causing cancer.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary Statements

P281 Use personal protective equipment as required.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P309 + P310 IF exposed or if you feel unwell: Immediately call a POISON CENTER or doctor/physician.

OSHA Hazards

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Other hazards

None known.

SECTION 3. Composition/information on ingredients

Formula	C ₅ H ₄ O ₂ (Hill)
CAS-No.	98-01-1
Molar mass	96.08 g/mol

Hazardous ingredients

Chemical Name (Concentration)

CAS-No.

2-furaldehyde (>= 90 % - <= 100 %)

98-01-1

SECTION 4. First aid measures

Description of first-aid measures

General advice

First aider needs to protect himself.

Inhalation

After inhalation: fresh air. Immediately apply artificial respiration. If necessary oxygen.
Immediately call in physician.

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Skin contact

After skin contact: wash off with plenty of water. Remove contaminated clothing. Consult a physician.

Eye contact

After eye contact: rinse out with plenty of water. Call in ophthalmologist.

Ingestion

If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

Irritation and corrosion, irritant effects, Cough, Shortness of breath, Headache, Convulsions, CNS disorders, paralysis symptoms

The following applies to aldehydes in general: irritations after contact with eyes and skin. Mucosal irritations, coughing, and dyspnoea after inhalation.

Indication of any immediate medical attention and special treatment needed

Laxative: Sodium sulfate (1 tablespoon/1/4 l water).

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Water, Carbon dioxide (CO₂), Foam, Dry powder

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

Special hazards arising from the substance or mixture

Combustible material, Vapors are heavier than air and may spread along floors.

Forms explosive mixtures with air at elevated temperatures.

Development of hazardous combustion gases or vapors possible in the event of fire.

Advice for firefighters

Special protective equipment for fire-fighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders: Protective equipment see section 8.

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Environmental precautions

Do not empty into drains.

Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills.

Observe possible material restrictions (see sections 7 and 10).

Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

SECTION 7. Handling and storage

Precautions for safe handling

Observe label precautions.

Work under hood. Do not inhale substance/mixture. Avoid generation of vapors/aerosols.

Conditions for safe storage, including any incompatibilities

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons. Protected from light.

Store at +15°C to +25°C (+59°F to +77°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Ingredients

Basis	Value	Threshold limits	Remarks
<i>2-furaldehyde 98-01-1</i>			
ACGIH	Time Weighted Average (TWA):	2 ppm	Can be absorbed through the skin.
	Skin designation:		
OSHA_TRANS	PEL:	5 ppm 20 mg/m ³	Can be absorbed through the skin.
	Skin designation:		
Z1A	Time Weighted Average (TWA):	2 ppm 8 mg/m ³	Can be absorbed through the skin.
	Skin designation (Final Rule Limit applies):		

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance. Work under hood. Do not inhale substance/mixture.

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Eye/face protection

Safety glasses

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Other protective equipment:

Flame retardant antistatic protective clothing

Respiratory protection

required when vapors/aerosols are generated.

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

SECTION 9. Physical and chemical properties

Physical state	liquid
Color	light brown
Odor	bitter almond-like
Odor Threshold	No information available.
pH	No information available.
Melting point	-35 °F (-37 °C)
Boiling point/boiling range	324 °F (162 °C)
Flash point	140 °F (60 °C)
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	2.1 %(V)
Upper explosion limit	19.3 %(V)
Vapor pressure	1 hPa at 68 °F (20 °C)
Relative vapor density	No information available.
Relative density	1.16 g/cm ³ at 68 °F (20 °C)
Water solubility	83 g/l at 68 °F (20 °C)

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Partition coefficient: n-octanol/water	log Pow: 0.83 (calculated) Bioaccumulation is not expected (log Pow <1). (Lit.)
Autoignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	No information available.
Explosive properties	No information available.
Ignition temperature	599 °F (315 °C)

SECTION 10. Stability and reactivity

Reactivity

Vapor/air-mixtures are explosive at intense warming.

Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

Possibility of hazardous reactions

Violent reactions possible with:

Risk of ignition or formation of inflammable gases or vapors with:

alkali hydroxides, alkalines, Strong oxidizing agents, mineral acids, acids

Conditions to avoid

Heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

Incompatible materials

rubber, various plastics

Hazardous decomposition products

no information available

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure

Inhalation, Eye contact, Skin contact

Target Organs

Eyes

Skin

Respiratory system

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Acute oral toxicity

LD50 rat: 65 mg/kg (RTECS)

absorption

Acute inhalation toxicity

LC50 rat: 0.7 mg/l; 6 h (RTECS)

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages: damage of respiratory tract

absorption

Irritating to respiratory system.

Acute dermal toxicity

absorption

Skin irritation

rabbit

Result: Irritations
(RTECS)

Causes skin irritation.

Eye irritation

rabbit

Result: Eye irritation
(RTECS)

Causes serious eye irritation.

CMR effects

Carcinogenicity:

Suspected of causing cancer.

Specific target organ systemic toxicity - single exposure

May cause respiratory irritation.

Specific target organ systemic toxicity - repeated exposure

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard

Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen

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ACGIH by NTP.
Confirmed animal carcinogen with unknown relevance to humans.
2-furaldehyde 98-01-1

Further information

Systemic effects:

Headache, CNS disorders, Convulsions, paralysis symptoms, Lung edema

After long-term exposure to the chemical:

Damage to:

Liver, Kidney

Other information

The following applies to aldehydes in general: irritations after contact with eyes and skin.

Mucosal irritations, coughing, and dyspnoea after inhalation.

Further data:

This substance should be handled with particular care.

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish

LC50 Salmo: 24 mg/l; 96 h (Hommel)

Toxicity to daphnia and other aquatic invertebrates

EC50 Daphnia magna (Water flea): 29 mg/l; 24 h (External MSDS)

Persistence and degradability

Theoretical oxygen demand (ThOD)

1,660 mg/g

(Lit.)

Ratio BOD/ThBOD

BOD5 46 %

(External MSDS)

Bioaccumulative potential

Partition coefficient: n-octanol/water

log Pow: 0.83

(calculated)

Bioaccumulation is not expected (log Pow <1). (Lit.)

Mobility in soil

No information available.

Other adverse effects

Additional ecological information

Biological effects:

Forms toxic mixtures in water, dilution measures notwithstanding.

Insecticide Fungicide

Further information on ecology

Discharge into the environment must be avoided.

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SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

UN number	UN 1199
Proper shipping name	FURALDEHYDES
Class	6.1 (3)
Packing group	II
Environmentally hazardous	--

Air transport (IATA)

UN number	UN 1199
Proper shipping name	FURALDEHYDES
Class	6.1 (3)
Packing group	II
Environmentally hazardous	--
Special precautions for user	no

Sea transport (IMDG)

UN number	UN 1199
Proper shipping name	FURALDEHYDES
Class	6.1 (3)
Packing group	II
Environmentally hazardous	--
Special precautions for user	yes
EmS	F-E S-D

SECTION 15. Regulatory information

United States of America

OSHA Hazards

Combustible Liquid
Toxic by inhalation.
Toxic by ingestion
Skin irritant
Eye irritant
Respiratory irritant
Carcinogen
Target organ effects

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This information is based on 29 CFR 1910.1200 criteria prior to adoption of the GHS, and may deviate from the GHS information on the label and in section 2.

SARA 311/312 Hazards

Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

Ingredients

2-furaldehyde

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

Ingredients

2-furaldehyde

US State Regulations

Massachusetts Right To Know

Ingredients

2-furaldehyde

Pennsylvania Right To Know

Ingredients

2-furaldehyde

New Jersey Right To Know

Ingredients

2-furaldehyde

California Prop 65 Components

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status

TSCA: On TSCA Inventory

DSL: All components of this product are on the Canadian DSL.

SECTION 16. Other information

Training advice

Provide adequate information, instruction and training for operators.

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Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapor.
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Date of issue: 12/20/2012

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

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