

Material Safety Data Sheet

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Version 1.3

According to 91/155/EEC

1 - Product and Company Information

Product Name	2-FURALDEHYDE, ACS, STAB.
Product Number	48070
Company	Sigma-Aldrich Pte Ltd #08-01 Citilink Warehouse Singapore 118529 Singapore
Technical Phone #	65 271 1089
Fax	65 271 1571

2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
2-FURALDEHYDE	98-01-1	202-627-7	605-010-00-4

Formula	C5H4O2
Molecular Weight	96.09 AMU
Synonyms	Artificial ant oil * Artificial oil of ants * 2-Formylfuran * 2-Formylofuran (Polish) * Fural * Furale * 2-Furalaldehyde * 2-Furancarboxal * 2-Furancarboxaldehyde * 2-Furankarbaldehyd (Czech) * Furfural * 2-Furfural * Furfural (ACGIH:OSHA) * Furfuraldehyde * Furfurale (Italian) * Furfurol * Furfurole * 2-Furil-metanale (Italian) * Furole * alpha-Furole * 2-Furylaldehyde * 2-Furylcarboxaldehyde * 2-Furyl-methanal * NCI-C56177 * Pyromucic aldehyde * RCRA waste number U125

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Harmful in contact with skin. Toxic by inhalation and if
swallowed. Irritating to eyes and respiratory system. Limited
evidence of a carcinogenic effect.
Carc. Cat.3

4 - First Aid Measures

AFTER INHALATION

If inhaled, remove to fresh air. If not breathing give
artificial respiration. If breathing is difficult, give oxygen.

AFTER SKIN CONTACT

In case of skin contact, flush with copious amounts of water for
at least 15 minutes. Remove contaminated clothing and shoes.
Call a physician.

AFTER EYE CONTACT

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

AFTER INGESTION

If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately. Do not induce vomiting.

5 - Fire Fighting Measures

EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

SPECIAL RISKS

Specific Hazard(s): Combustible liquid. Emits toxic fumes under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Cover with dry lime or soda ash, pick up, keep in a closed container, and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING

Directions for Safe Handling: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Conditions of Storage: Keep tightly closed. Keep away from heat and open flame. Store in a cool dry place.
Store at 2-8°C

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS

Use only in a chemical fume hood. Safety shower and eye bath.

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	10 MG/M3
Poland		NDSCh	40 MG/M3

Poland	NDSP	-
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EXPOSURE LIMITS - DENMARK		
Source	Type	Value
OEL	TWA	7.9 mg/m3 2 ppm

Remarks: HK

EXPOSURE LIMITS - GERMANY		
Source	Type	Value
TRGS 900	OEL	20 mg/m3 5 ppm

Remarks: H

EXPOSURE LIMITS - NORWAY		
Source	Type	Value
	OEL	8 mg/m3 2 ppm

Remarks: H

EXPOSURE LIMITS - SWEDEN		
Source	Type	Value
	LLV (Level)	8 mg/m3 2 ppm

Remarks: H

EXPOSURE LIMITS - SWITZERLAND		
Source	Type	Value
OEL	OEL	8 mg/m3 2 ppm

Remarks: H

EXPOSURE LIMITS - UNITED KINGDOM		
Source	Type	Value
OEL	OEL	8 mg/m3 2 ppm
OEL	STEL	20 mg/m3 5 ppm

Remarks: Skin

PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection: Government approved respirator.
 Hand Protection: Compatible chemical-resistant gloves.
 Eye Protection: Chemical safety goggles.
 Special Protective Measures: Faceshield (8-inch minimum).

9 - Physical and Chemical Properties

Appearance	Color: Light brown-yellow Form: Clear liquid
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Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	54 - 56 °C	11 mmHg
MP/MP Range	-36 °C	
Flash Point	60 °C	Method: closed cup
Flammability	N/A	
Autoignition Temp	315 °C	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	Lower: 2.1 %	

	Upper: 19.3 %	
Vapor Pressure	1.7 mmHg	20 °C
SG/Density	1.159 g/cm3	
Partition Coefficient	Log Kow: 0.41	
Viscosity	1.49 Pas	25 °C
Vapor Density	3.31 g/l	
Saturated Vapor Conc.	N/A	
Evaporation Rate	N/A	
Bulk Density	N/A	
Decomposition Temp.	N/A	
Solvent Content	N/A	
Water Content	< 0.1 %	
Surface Tension	43.5 mN/m	20 °C
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:Soluble. Other Solvents: ETHER,ALCOHOL, BENZENE CHLOROFORM	

10 - Stability and Reactivity

STABILITY

Stable: Stable.

Conditions to Avoid: Light. Moisture. Air.

Materials to Avoid: Oxidizing agents, Strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: May occur

11 - Toxicological Information

RTECS NUMBER: LT7000000

ACUTE TOXICITY

LD50

Oral

Rat

65 mg/kg

LC50

Inhalation

Rat

175 ppm

6H

Remarks: Lungs, Thorax, or Respiration:Other changes.

Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

LD50

Intraperitoneal

Rat

20 MG/KG

LD50

Subcutaneous

Rat

148 MG/KG

Remarks: Behavioral:Convulsions or effect on seizure threshold.

LD50
Oral
Mouse
400 mg/kg
Remarks: Tumorigenic:Active as anti-cancer agent.

LD50
Intraperitoneal
Mouse
102 MG/KG

LD50
Subcutaneous
Mouse
119 MG/KG

LD50
Intravenous
Mouse
152 MG/KG

LD50
Oral
Dog
950 mg/kg
Remarks: Behavioral:Convulsions or effect on seizure threshold.
Behavioral:Ataxia. Gastrointestinal:Nausea or vomiting.

LC50
Inhalation
Dog
370 ppm
6H

LD50
Subcutaneous
Dog
214 MG/KG

LD50
Intravenous
Dog
250 MG/KG

LD50
Intramuscular
Rabbit
78 MG/KG

LD50
Oral
Guinea pig
541 mg/kg
Remarks: Liver:Hepatitis (hepatocellular necrosis), zonal.
Kidney, Ureter, Bladder:Changes in tubules (including acute
renal failure, acute tubular necrosis). Blood: Hemorrhage.

IRRITATION DATA

Skin
Rabbit

20 mg
24H
Remarks: Moderate irritation effect

Skin
Rabbit
500 mg
24H
Remarks: Mild irritation effect

Eyes
Rabbit
100 mg
24H
Remarks: Moderate irritation effect

SENSITIZATION

Sensitization: May cause allergic respiratory and skin reactions
Causes photosensitivity. Exposure to light can result in
allergic reactions resulting in dermatologic lesions, which can
vary from sunburnlike responses to edematous, vesiculated
lesions, or bullae

SIGNS AND SYMPTOMS OF EXPOSURE

Causes central nervous system (CNS) depression, loss of taste,
numbness of the tongue, headaches, and stupor. Material is
extremely destructive to tissue of the mucous membranes and
upper respiratory tract, eyes, and skin. Inhalation may result
in spasm, inflammation and edema of the larynx and bronchi,
chemical pneumonitis, and pulmonary edema. Symptoms of exposure
may include burning sensation, coughing, wheezing, laryngitis,
shortness of breath, headache, nausea, and vomiting. To the best
of our knowledge, the chemical, physical, and toxicological
properties have not been thoroughly investigated.

ROUTE OF EXPOSURE

Skin Contact: Causes burns.
Skin Absorption: Toxic if absorbed through skin.
Eye Contact: Causes burns.
Inhalation: Toxic if inhaled. Material is extremely destructive
to the tissue of the mucous membranes and upper respiratory
tract.
Ingestion: Toxic if swallowed.

TARGET ORGAN INFORMATION

Nerves. Liver. Kidneys.

CONDITIONS AGGRAVATED BY EXPOSURE

May cause nervous system disturbances.

CHRONIC EXPOSURE - CARCINOGEN

Result: Possible carcinogen.

Rat
Route of Application: Oral
Exposure Time: 2Y
Result: Tumorigenic: Equivocal tumorigenic agent by RTECS
criteria. Liver: Tumors.

Mouse
Route of Application: Oral
Exposure Time: 2Y

Result: Tumorigenic: Carcinogenic by RTECS criteria. Liver: Tumors.

CHRONIC EXPOSURE - MUTAGEN

Human
3 MMOL/L
Cell Type: HeLa cell
DNA inhibition

Human
70 UMOL/L
Cell Type: lymphocyte
Sister chromatid exchange

Mouse
100 MG/KG
Oral
Other mutation test systems

Mouse
200 MG/L
Cell Type: lymphocyte
Mutation in mammalian somatic cells.

Hamster
1 GM/L
Cell Type: lung
Other mutation test systems

Hamster
1 GM/L
Cell Type: lung
Cytogenetic analysis

Hamster
2500 UMOL/L
Cell Type: ovary
Cytogenetic analysis

Hamster
11700 UG/L
Cell Type: ovary
Sister chromatid exchange

12 - Ecological Information

ECOTOXICOLOGICAL EFFECTS

Test Type: EC50 Algae
Time: 24 h
Value: 570 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 29 mg/l

Test Type: LC50 Fish
Species: Leuciscus idus
Time: 48 h
Value: 29 mg/l

Test Type: LC50 Fish
Species: Lepomis macrochirus (Bluegill)
Time: 48 h
Value: 16 mg/l

Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 32 mg/l

13 - Disposal Considerations

SUBSTANCE DISPOSAL

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

14 - Transport Information

RID/ADR

UN#: 1199
Class: 6.1
PG: II
Proper Shipping Name: Furaldehydes

IMDG

UN#: 1199
Class: 6.1
PG: II
Subrisk: 3
Proper Shipping Name: FURFURALDEHYDES
Marine Pollutant: No
Severe Marine Pollutant: No

IATA

UN#: 1199
Class: 6.1
PG: II
Subrisk: 3
Proper Shipping Name: Furaldehydes
Inhalation Packing Group I: No

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES

ANNEX I INDEX NUMBER: 605-010-00-4

INDICATION OF DANGER: T

Toxic.

R-PHRASES: 21 23/25 36/37 40

Harmful in contact with skin. Toxic by inhalation and if swallowed. Irritating to eyes and respiratory system. Limited evidence of a carcinogenic effect.

S-PHRASES: 26 36/37/39 45

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

COUNTRY SPECIFIC INFORMATION

Germany

WGK: 2

SWITZERLAND

SWISS POISON CLASS: 3

16 - Other Information

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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