



Furfural

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1 Identification of the substance

Chemical name	2-Furaldehyde		
Synonyms	Furan-2-carboxaldehyde, Furale, Furfuraldehyde, 2-Furylmethanal, Pyromucis aldehyde, Ant Oil, Furanaldehyde		
Formula	C ₅ H ₄ O ₂		
Molecular mass	96,09	FL No.	13.018
CAS-No.	98-01-1	FEMA No.	2489
EC-No.	202-627-7	Annex-1 No.	605-010-00-4

1.2 Use of the substance

Solvent for lubricating oil purification, butadiene extraction, crucible manufacture, ball-bearings manufacture, grinding wheel manufacture, polymers, diesel tracer, acid resistant coatings, flavour.

1.3 Company identification

Manufacturer	Illovo Sugar Ltd.
Address	Illovo Sugar Park 1 Montgomery Drive Mount Edgecombe 4300 South Africa
Telephone number	+27 31 450 77 00
Telefax number	+27 31 459 49 22
E-mail address	treed@illovo.co.za

1.4 Emergency telephone

– Local South Africa	0800 17 27 43	
– International	+27 11 815 60 15	+27 82 775 33 05
Medical information	+31 30 274 88 88 Dutch Poison Information Centre; only for medical attendants, or National Poison Information Centre.	

2. HAZARDS IDENTIFICATION

2.1 Physico-chemical hazards

- Fire Combustible.
- Explosion Above 60 °C: explosive vapour-air mixtures may be formed.

2.2 Human health hazards

The substance is toxic by inhalation and if swallowed and is harmful in contact with skin.
The substance is irritating to eyes, skin and respiratory system.
Limited evidence of a carcinogenic effect.

2.3 Environmental hazards

The substance is harmful to fish and Daphnia's.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Component	CAS-No.	EC-No.	Percentage	Symbol	R-phrases
2-Furaldehyde	98-01-1	202-627-7	> 99	T	21-23/25-36/37/38-40

4. FIRST AID MEASURES

Inhalation	Fresh air, rest, half upright position, and transport to hospital.
Skin contact	Remove contaminated clothes, rinse skin with water or shower and transport to a doctor.
Eye contact	First rinse with plenty of water (remove lenses if possible), transport to a doctor.
Ingestion	Rinse mouth, and transport to hospital immediately. The symptoms of lung oedema often do not become manifest until a few hours have passed, and they are aggravated by physical effort; rest and hospitalization is therefore essential.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	Powder, water spray, foam, carbon dioxide.
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Special exposure hazards

In case of fire toxic gases are formed (carbon monoxide).

Special protective equipment for fire-fighters

Self-contained breathing apparatus.

Other measures

In case of fire: keep drums cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Additional ventilation.
Wear chemical-resistant clothing and fresh-air hoods/self-contained breathing apparatus.

Environmental precautions

Do not discharge in surface water or soil.

Methods for cleaning up

When spillage is more than 50 litres evacuate danger area. Dam spilled substance in and remove carefully with special vacuum cleaner; recycle if possible. Collect remainder in inert absorbent or use 10% sodium bisulphite (be careful: reaction). Keep reaction product at least some hours. Collect reaction product in inert absorbent and store carefully in containers. Wash away remainder with water. Flush water into sewage.

7. HANDLING AND STORAGE

7.1 Handling

Use only in well-ventilated areas.
No open flames and no smoking.
Above 60 °C: closed system.

7.2 Storage

The colour turns to red brown during storage.
The substance affects many synthetic materials; store only in original packing, do not apply plastics.
Separated from oxidants, strong acids and strong bases, cool, dark, ventilation along the floor.

7.3 Specific use(s)

If used in food: comply with food safety regulation (HACCP).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values

Country	Limit values				Notation
	8 hours (TWA)		Short term (15 min.)		
	mg/m ³	ppm	mg/m ³	ppm	
Austria	20	5			skin
Belgium	8	2			skin
Czech Republic	10	2,5	8	2	C (20 mg/m ³), skin
Denmark	7,9	2			skin
Finland	8	2	20	5	skin
France			8	2	
Germany	n.d. (previous 20 mg/ m ³)		n.d.		
Italy	8	2	20	5	skin
Netherlands	8	2	20	5	skin
Norway	8	2			
Poland	10	2,5	40	10	
Portugal	8	2			skin
Spain	8	2			
Sweden	8	2	20	5	skin
Switzerland	8	2			skin
United Kingdom	8	2	20	5	skin

n.d. not determined



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8.2 Exposure control

8.2.1 Occupational exposure controls

Closed equipment.
Ventilation and local exhaust.

a) Respiratory protection

Filter respirator for organic vapours (filter type A).

b) Hand protection

Gloves (butyl rubber, polyvinyl alcohol, viton).

c) Eye protection

Safety goggles.

d) Skin protection

Protective clothing.

8.2.2 Environmental exposure controls

Direct polluted air of the local exhaust ventilation out of the plant in a manner in accordance with environmental regulations.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 General information

Appearance

Colourless to yellow oily liquid.

Odour

Characteristic: pungent, almond.

9.2 Important health, safety and environmental information

pH

Not available

Boiling point / boiling range (°C)

162

Flash point (°C)

60 (closed cup)

Explosive limits (vol%)

2,1 – 19,3

Oxidising properties

None

Vapour pressure at 20 °C (mbar)

1,4

Relative density (water=1)

1,2

Solubility

– Water solubility at 20 °C (g/l)

83

– Fat solubility

Good

Partition coefficient (Log P) n-octanol/water

0,67

Viscosity at 20 °C (mPa.s)

14,9

Relative vapour density (air=1)

3,31

Evaporation rate (compared to ether)

75

9.3 Other information

Miscibility with

Acetone, benzene

Conductivity (pS/m)

Not available

Melting point / melting range (°C)

Approx. –37,5

Auto-ignition temperature (°C)

Approx. 315

Heat of combustion: (kJ/kg)

Not available

Odour threshold (mg/m³)

0,3

10. STABILITY AND REACTIVITY

Stability

Turns to red brown on exposure to air and light and resinifies.

Possibility of hazardous reactions

Reacts violently with oxidants; reacts violently with strong acids and strong bases with the possibility of fire and explosion (resinification).

10.1 Conditions to avoid

Avoid contact with heat sources and air and protect against direct sunlight.

10.2 Materials to avoid

Avoid contact with oxidants, strong acids and bases.

10.3 Hazardous decomposition products

Upon decomposition emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.



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11. TOXICOLOGICAL INFORMATION

Short-term exposure

The substance may be absorbed into the body by inhalation of vapour or spray, ingestion and through the skin.
 The substance is toxic by way of inhalation and swallowing.
 The substance affects the lungs and the central nervous system, serious cases may result in weakness, coma.
 The substance is irritating to the eyes, the skin and the respiratory system.
 Inhalation of vapour or spray may cause shortness of breath (lung oedema).

Acute symptoms

- Inhalation Sore throat, coughing, shortness of breath, laboured breathing.
- Skin Redness, pain, burns.
- Eyes Redness, pain, blurred vision.
- Ingestion Sore throat, abdominal pain, vomiting.

Short-term hazards animals

LD50 (oral, rat) (mg/kg)	65
LD50 (dermal, rabbit) (mg/kg)	500 – 1000
LC50 (inhalation, rat, 4 hours) (mg/l)	0,9

Long-term exposure

In oral studies, furfural gave evidence of liver carcinogenicity in rats and mice.

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity

LC50 (fish, 96 hours) (mg/l)	32
EC50 (Daphnia, 48 hours) (mg/l)	29
IC50 (algae, 72 hours) (mg/l)	Not available

12.2 Mobility

Adsorption coefficient (Koc) solid phase / liquid phase	2,6 (highly mobile)
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12.3 Persistence and degradability

Oxygen demand		% of TOD
- biological (5 days) in gO ₂ /g (BOD ₅)	0,77	46
- biological (20 days) in gO ₂ /g (BOD ₂₀)	Not available	
- chemical in gO ₂ /g (COD)	1,67	
BOD ₅ : COD	0,46	

12.4 Bioaccumulative potential

BCF (Bioconcentration factor) (conc. in organisms / conc. in water)	Not available. Risk of bio accumulation is low (log P octanol/water ≤ 3,0).
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12.5 Results of PBT assessment

Does not meet the criteria for PBT or vPvB substances.

12.6 Other adverse effects

Ozone depletion potential (ODP) (CCl ₃ F = 1)	Not applicable
Photochemical ozone creation potential (C ₂ H ₄ = 1)	Not available
Global warming potential (GWP) (CO ₂ = 1)	Not applicable
Water hazard class (WGK Germany)	2 (hazardous to water)

13. DISPOSAL CONSIDERATIONS

Disposal

The substance has to be removed as hazardous waste to a specialised processing facility for disposal in accordance with local regulations.

European waste list (EURAL)

07 01 04



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14 TRANSPORT INFORMATION

UN No.	1199
ADR / RID (road / rail)	
Proper shipping name	FURFURALDEHYDES
Class	6.1
Classification code	TF1
Packing group	II
Risk label(s)	6.1 + 3
Hazard Identification Number (Kemler code)	63
Transport emergency card	61GTF1-II; 61S1199
Emergency Response Information Card (ERIC)	6-14
IMDG (sea)	
Proper shipping name	FURFURALDEHYDES
Class	6.1
Packing group	II
Risk label(s)	6.1 + 3
Marine pollutant	No
Emergency Schedules (EmS)	
– Fire schedule	Echo (F-E)
– Spillage schedule	Delta (S-D)
ICAO / IATA (air)	
Proper shipping name	FURFURALDEHYDES
Class	6.1
Packing group	II

15 REGULATORY INFORMATION

Danger category Toxic
 Danger symbols



Risk phrases	
R23/25	Toxic by inhalation and if swallowed.
R21	Harmful in contact with skin.
R36/37/38	Irritating to eyes, respiratory system and skin.
R40	Limited evidence of a carcinogenic effect.
Safety phrases	
S36/37	Wear suitable protective clothing and gloves.
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16 OTHER INFORMATION

Source of information
 IUCLID Dataset, European Chemicals Bureau, 19-02-2000
 Risk Assessment (Draft), April 2007
 EaSi-Pro View Substance Report, Haskoning, Oct. 2007
 30th adapting to technical progress Council Directive 67/548/EEC, august 2008

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