

FURFURAL

CODE :
MSDS 106 - E



Toxic

Based on Regulation (EC) N° 1907/2006 (REACH) Article 31 Annex II

1. Chemical Product and Company Identification

1.1 Identification of the substance or preparation:

Product name : FURFURAL

Synonyms : 2-furaldehyde

CAS No. : 98-01-1

EC index No. : 605-010-00-4

EINECS No. : 202-627-7

RTECS No. : LT7000000

NFPA code : 3-2-1

Molecular weight : 96.09

Formula : C₅H₄O₂

1.2 Use of the substance or the preparation:

Essence

Fuel: additive

Pharmaceutical product: raw material

Chemistry: raw material

Impregnating agent

Solvent

1.3 Company/undertaking identification:

International Furan Chemicals B.V.

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(Nederland)

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1.4 Telephone number for emergency:

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Technische Schoolstraat 43 A, B-2440 Geel

2. Hazards Identification

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

3. Composition, Information on Ingredients

Hazardous ingredients	CAS No. EINECS/ELINCS No.	Conc. in %	Hazard symbol	Risks
2 - furaldehyde	98-01-1 202-627-7	> 98	T	21-23/25-36/37/38-40 (1)

(1) For R-phrases in full: see heading 16

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4. First Aid Measures

4.1 Eye contact:

- Consult a doctor/medical service if irritation persists
- Rinse immediately with plenty of water
- Do not apply neutralizing agents

4.2 Skin contact:

- Consult a doctor/medical service if irritation persists
- Wash immediately with lots of water
- Soap may be used
- Do not apply (chemical) neutralizing agents

4.3 After inhalation:

- Unconscious: maintain adequate airway and respiration
- Remove the victim into fresh air
- Immediately consult a doctor/medical service

4.4 After ingestion:

- Consult a doctor/medical service if you feel unwell
- Give nothing or little to drink
- Victim is fully conscious: immediately induce vomiting
- Never give water to an unconscious person

5. Fire Fighting Measures

5.1 Suitable extinguishing media:

- Water spray
- Alcohol-resistant foam
- BC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:

- Container may slop over if solid jet is applied

5.3 Special exposure hazards:

- Material presenting a fire hazard
- Upon combustion CO and CO₂ or formed

5.4 Instructions:

- Cool tanks/drums with water spray/remove them into safety
- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

5.5 Special protective equipment for firefighters:

- Heat/fire exposure: compressed air/oxygen apparatus
- Large spills/in enclosed spaces: compressed air apparatus

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6. Accidental Release Measures

6.1 Personal protection/precautions:

See heading 8.2/13

6.2 Environmental precautions:

- Prevent soil and water pollution
- Prevent spreading in sewer
- Contain released substance, pump into suitable containers
- Plug the leak, cut off the supply
- Dam up the liquid spill

6.3 Methods of cleaning up:

- Take up Liquid spill into absorbent material, e.g. : sand, earth, vermiculite, kieselguhr, powdered limestone or sodium bicarbonate
- Scoop absorbed substance into closing containers
- Carefully collect the spill/leftovers
- Damaged/cooled tanks must be emptied
- Clean contaminated surfaces with an excess of water

7. Handling and Storage

7.1 Handling:

- Observe strict hygiene
- Use earthed equipment
- Do not discharge the waste into the drain
- Remove contaminated clothing immediately
- Clean contaminated clothing

7.2 Storage:

- Keep container tightly closed
- Store at ambient temperature
- Store in a dark area
- Ventilation at floor level
- Keep away from: heat sources, combustible materials, oxidizing agents, acids, bases

Storage temperature 20°C
Quantity limits N.D.kg
Storage life N.D.days

Materials for packaging :

- suitable : steel, stainless steel, aluminium, iron
- to avoid: synthetic material

7.3 Specific uses:

- See information supplied by the manufacturer

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8. Exposure Controls, Personal Protection

8.1 Exposure limit values:

TLV-TWA		mg/m ³	2	ppm
TLV-STEL		mg/m ³		ppm
TLV-Ceiling		mg/m ³		ppm
WEL-LTEL	8	mg/m ³	2	ppm
WEL-STEL	20	mg/m ³	5	ppm
MAK		mg/m ³		ppm
MAC-TGG 8 h	8	mg/m ³		
MAC-TGG 15 min.		mg/m ³		
MAC-Ceiling :		mg/m ³		
VME-8 h		mg/m ³		ppm
VLE-15 min.	8	mg/m ³	2	ppm
GWBB-8 h	8.0	mg/m ³	2	ppm
GWK-15 min.		mg/m ³		ppm
Momentary value		mg/m ³		ppm
EC		mg/m ³		ppm
EC-STEL		mg/m ³		ppm

Sampling methods

- Furfural NIOSH 2529
- Furfural OSHA 72
- Furfural(See Aldehydes, Screening) NIOSH 2539

8.2 Exposure controls:

8.2.1 Occupational exposure controls:

- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

8.2.1.1 Respiratory protection:

Wear gas mask with filter type A if conc. in air > exposure limit

8.2.1.2 Hand protection:

- Gloves
- Suitable materials: Butyl rubber
PVA
Tetrafluoroethylene
Viton
- Breakthrough time: N.D.

8.2.1.3 Eye protection:

- Face shield

8.2.1.4 Skin protection:

- Protective clothing
- Suitable materials: Butyl rubber
PVA
Tetrafluoroethylene

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Viton

8.2.2 Environmental exposure controls: See heading 6.2, 6.3 and 13.

9. Physical and Chemical Properties

9.1 General information:

Appearance (at 20°C)	Liquid
Odour	Almond, pungent
Colour	Light-yellow to brown

9.2 Important health, safety and environmental information:

pH value	3.5/ 4.5	
Boiling point/boiling range	162	°C
Flashpoint	60	°C
Explosion limits	2.1/19.3	vol%
Vapour pressure (at 20°C):	1.3	hPa
Vapour pressure (at 50°C):	13	hPa
Relative density (at 20°C)	1.2	
Water solubility	8.3 g/ 100 ml	
Soluble in	Ethanol, ether, acetone, chloroform	
Relative vapour density	3.3	
Viscosity(at 25°C)	0.015	Pa.s
Partition coefficient n-octanol/water	0.67	
Evaporation rate		
-ratio to butyl acetate	N.D.	
-ratio to ether	75	

9.3 Other information:

Melting point/melting range	- 37	°C
Auto-ignition point	315	°C
Saturation concentration	5.9	g/m ³

10. Stability and Reactivity

10.1 Conditions to avoid/reactivity:

- Unstable on exposure to light
- Unstable on exposure to air

10.2 Materials to avoid:

- Keep away from: heat sources, combustible materials, oxidizing agents, acids, bases
- Keep away from: plastic

10.3 Hazardous decomposition products:

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- Oxidizes slowly on exposure to air
- Decomposes slowly on exposure to light
- Upon combustion CO and CO₂ are formed
- Violent to explosive reaction with many compounds e.g.: with (strong) oxidizers
- And with (some) acids/bases: heat release resulting in increased fire or explosion risk
- Polymerizes on exposure to. (strong) acids/bases
- This reaction is accelerated on exposure to temperature rise

11. Toxicological Information

11.1 Acute toxicity:

LD50 oral rat	65	mg/kg
LD50 dermal rat	N.D.	mg/kg
LD50 dermal rabbit	500/1000	mg/kg
LC50 inhalation rat	0.9	mg/l/4 h
LC50 inhalation rat	N.D.	ppm/4 h

11.2 Chronic toxicity:

2-furaldehyde

EC carc. cat.	3
EC muta. cat.	not listed
EC repr. cat.	not listed

Carcinogenicity (TLV)	A3
Carcinogenicity (MAC)	not listed
Carcinogenicity (VME)	C3
Carcinogenicity (GWBB)	not listed

Carcinogenicity (MAK)	3B
Mutagenicity (MAK)	not listed
Teratogenicity (MAK)	-

IARC classification	3
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11.3 Routes of exposure : ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

11.4 Acute effects/symptoms:

AFTER INHALATION :

- Irritation of the respiratory tract
- Irritation of the nasal mucous membranes
- Headache
- CNS depression
- Dizziness
- Disturbances of consciousness
- Disturbances of heart rate
- Respiratory difficulties
- Risk of lung oedema
- Dry/sore throat

AFTER INGESTION :

- Vomiting
- Nausea
- Abdominal pain
- Diarrhoea

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- AFTER ABSORPTION OF HIGH QUANTITIES :** - Coordination disorders
- Cramps/uncontrolled muscular contractions
- AFTER SKIN CONTACT :** - May stain the skin
- AFTER EYE CONTACT :** - Irritation of the eye tissue
- Conjunctivitis
- Lacrimation

11.5 Chronic effects:

- No certainty about human carcinogenic properties
- Not listed in mutagenicity class (EC, MAK)
- Not classified as toxic to reproduction (EC)

ON CONTINUOUS EXPOSURE/CONTACT

- Enlargement/affection of the liver
- Affection of the renal tissue
- Feeling of weakness
- Skin rash/inflammation
- Tremor
- Nosebleeding

12. Ecological Information

12.1 Ecotoxicity:

- | | | | |
|---------------|----|------|-----------------------|
| - LC50 (96 h) | 32 | mg/l | (PIMEPHALES PROMELAS) |
| - EC50 (48 h) | 29 | mg/l | (DAPHNIA MAGNA) |

12.2 Mobility:

- **Volatile organic compounds (VOC):** 100%
 - Moderately soluble in water
- For other physicochemical properties see heading 9

12.3 Persistence and degradability:

- **biodegradation BOD₅:** 46% ThOD
- **water:** - Readily biodegradable in water
- test: 93.5% 14d., mitil OECD 301C
- **soil:** T $\frac{1}{2}$: N.D. days

12.4 Bioaccumulative potential:

- **log P_{ow}** 0.67
- **BCF** N.D.
- Slightly or not bioaccumulative

12.5 Other adverse effects:

- **WGK :** 2 (Classification in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 27 July 2005)
- **Effect on the ozone layer :** Not dangerous for the ozone layer (Council Regulation (EC) No 2037/2000, O.J. L244 of 29/09/2000)

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- Greenhouse effect : no data available
- Effect on waste water purification: no data available

13. Disposal Considerations

13.1 Provisions relating to waste:

- Waste material code (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001) : 07 01 04* (other organic solvents, washing liquids and mother liquors)
- LWCA (the Netherlands) : KGA category 03
- Hazardous waste (91/689/EEC)

13.2 Disposal methods:

- Recycle by distillation
- Remove to an authorized waste incinerator for solvents
- Do not discharge into surface water

13.3 Packaging:

Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001) : 15 01 10* (packaging containing residues of or contaminated by dangerous substances)

14. Transport Information

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1199

14.1 Classification of the substance in compliance with UN Recommendations

UN-number	1199
CLASS	6.1
SUB RISKS	3
PACKING	II
PROPER SHIPPING NAME	UN 1199, Furaldehydes

14.2 ADR (transport by road)

CLASS	6.1
PACKING	II
CLASSIFICATION CODE	TF1
DANGER LABEL TANKS	6.1+3
DANGER LABEL PACKAGES	6.1+3

14.3 RID (transport by rail)

CLASS	6.1
PACKING	II
CLASSIFICATION CODE	TF1
DANGER LABEL TANKS	6.1+3
DANGER LABEL PACKAGES	6.1+3

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14.4 ADNR (transport by inland waterways)

CLASS	6.1
PACKING	II
LASSIFICATION CODE	TF1
DANGER LABEL TANKS	6.1+3
DANGER LABEL PACKAGES	6.1+3

14.5 IMDG (maritime transport)

CLASS	6.1
SUB RISKS	3
PACKING	II
MFAG	-
EMS	F - E, S - D
MARINE POLLUTANT	-

14.6 ICAO (air transport)

CLASS	6.1
SUB RISKS	3
PACKING	II
PACKING INSTRUCTIONS PASSENGER AIRCRAFT	609/Y609
PACKING INSTRUCTIONS CARGO AIRCRAFT	611

14.7 Special precautions in connection with transport: none

14.8 Limited quantities (LQ):

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:

each package shall display a diamond-shaped figure with the following inscription:

- 'UN 1199'

or, in the case of different goods with different identification numbers within a single package:

- the letters 'LQ'

15. Regulatory Information

15.1 EU legislation

Enumerated in substance list Annex I of directive 67/548/EEC et sequens



Toxic

R21:	Harmful in contact with skin
R23/25:	Toxic by inhalation and if swallowed
R36/37/38:	Irritating to eyes, respiratory system and skin
R40:	Limited evidence of a carcinogenic effect
S(01/02):	(Keep locked up and out of reach of children)
S26:	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S36/37:	Wear suitable protective clothing and gloves
S45:	In case of accident or if you feel unwell, seek medical advice (show the label where possible)

15.2 National provisions

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The Netherlands : Waterbezwaarlijkheid : 9

Germany : WGK : 2 (Classification in compliance with Verwaltungsvorschrift wassergefährrender Stoffe (VwVwS) of 27 July 2005)

16. Other Information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

Exposure limits:

TLV: Threshold Limit Value - ACGIH USA
WEL: Workplace Exposure Limits - United Kingdom
MAK: Maximale Arbeitsplatzkonzentrationen - Germany
MAC: Maximale aanvaarde concentratie - The Netherlands
VME: Valeurs limites de Moyenne d'Exposition - France
VLE: Valeurs limites d'Exposition à court terme - France
GWBB: Grenswaarde beroepsmatige blootstelling - Belgium
GWK: Grenswaarde kortstondige blootstelling - Belgium
EC: Indicative occupational exposure limit values - directive 2000/39/EC

Chronic toxicity :

K:List of the carcinogenic substances and processes - the Netherlands

Full text of any R-phrases referred to under heading 2:

R21: Harmful in contact with skin
R23/25: Toxic by inhalation and if swallowed
R36/37/38: Irritating to eyes, respiratory system and skin
R40: Limited evidence of a carcinogenic effect