1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1 Product identifier

Chemical name: 2-Furanmethanol

Formula: \( C_6H_6O_2 \)
Molecular mass: 98.10
CAS-No.: 98-00-0
EC-No.: 202-626-1
Registration number: 01-2119493965-18-0003

1.2 Relevant identified uses of the substance and uses advised against

Use / Activity | Exposure scenario
--- | ---
Manufacturing of blends / formulation | ES 2
Manufacturing of polymers | ES 3
Manufacturing of moulds using formulations containing the substance (foundry) | ES 4
Manufacturing of refractories, abrasive wheels, friction (brake pads, clutch facing), carbon impregnation using formulations containing the substance | ES 5
Wood impregnation / modification | ES 6
Professional end-use of acid resistant coating | ES 7
Uses advised against | None

1.3 Details of the supplier of the safety data sheet

Importer: International Furan Chemicals B.V.
Address: Rotterdam Airportplein 7
3045 AP ROTTERDAM
The Netherlands

Telephone number: +31 10 238 05 55
Telefax number: +31 10 238 05 50
E-mail address: sales@furan.com

1.4 Emergency telephone numbers

Emergency: +32 14 58 45 45 (24 h /24 h) Information centre of dangerous goods (BIG)
Medical information:
- England and Wales: 0845 46 47 or 111 NHS Direct
- Scotland: 0844 892 01 11 NPIS London, for healthcare professionals
- Republic of Ireland: +353 (0) 1 809 21 66 NPIC Dublin, 8 am – 10 pm
  +353 (0) 1 837 99 64 for healthcare professionals
  +353 (0) 1 809 25 66 for healthcare professionals

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance

According to Regulation (EC) No. 1272/2008 (EU-GHS / CLP)
Hazard Classes / Hazard Class- Category- and -Statement Codes

Acute toxicity | Acute Tox. 2, H330
Acute toxicity | Acute Tox. 3, H301
Acute toxicity | Acute Tox. 3, H311
Eye irritation | Eye Irrit. 2, H319
Skin irritation | Skin Irrit. 2, H315
Carcinogenicity | Carc. 2, H351
Specific target organ toxicity – single exposure | STOT SE 3, H335
Specific target organ toxicity – repeated exposure | STOT RE 2, H373

According to Directive 67/548/EEC (EU DSD / DPD)
Indications of danger and risk phrases

Carc. Cat. 3 | R40
Toxic | R23
Harmful | R21/22-48/20
Irritant | R36/37/38
Essential adverse effects

The substance is toxic by inhalation and if swallowed and is harmful in contact with skin. Irritating to eyes, respiratory system and skin.

2.2 Label elements

According to Regulation (EC) No. 1272/2008 (CLP)

Hazard pictograms

Signal word
Danger

Hazard statements

H330 Fatal if inhaled.
H301 Toxic if swallowed.
H311 Toxic in contact with skin.
H319 Causes serious eye irritation.
H315 Causes skin irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.
H373 May cause damage to respiratory - nasal tissue through prolonged or repeated exposure by inhalation.

Precautionary statements

P201 Obtain special instructions before use.
P271 Use only outdoors or in a well-ventilated area.
P281 * Use personal protective equipment as required.
P403 + P233 * Store in a well-ventilated place. Keep container tightly closed.
P304 + P340 + P310 * 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.
P301 + P310 * IF SWALLOWED: Immediately call a POISON CENTER or doctor / physician.
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.
P308 + P313 * IF exposed or concerned: Get medical advice / attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Disposal: Dispose of contents / container to a specialised processing facility for disposal in accordance with local / regional regulations.

* on label

2.3 Other hazards

Furfuryl alcohol does not meet the criteria for PBT or vPvB according to Regulation 1907/2006.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Main constituent | Identity | Percentage
Furfuryl alcohol | CAS-No. 98-00-0 | ≥ 97.0 - ≤ 100.0 %
| EC-No. 202-626-1 |

Classified impurities or stabilizers

None

4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation
Fresh air, rest, half upright position. Get medical advice / attention if you feel unwell.

Skin contact
Remove contaminated clothes, rinse skin with water or shower. If skin irritation occurs: get medical advice / attention.

Eye contact
First rinse with plenty of water (remove lenses if possible). If eye irritation persists: get medical advice / attention.

Ingestion
Rinse mouth. Immediately call a doctor / physician if you feel unwell.

4.2 Most important symptoms and effects, both acute and delayed

Respiratory irritation (nose and upper respiratory tract). Eye and skin irritation.
4.3 Indication of any immediate medical attention and special treatment needed

Information on medical attendance
Not necessary.

Special means to provide treatment at the workplace
Not necessary.

5. **FIREFIGHTING MEASURES**

5.1 Extinguishing media

Suitable extinguishing media
Powder, water spray, alcohol-resistant foam, carbon dioxide.

Unsuitable extinguishing media
Alcohol unstable foam.

5.2 Special hazards arising from the substance

Hazardous combustion products
May produce toxic fumes of carbon monoxide if burning.

Additional hazards
Extreme generation of heat in the case of larger fires.

5.3 Advice for fire-fighters

Protective actions
In case of fire: keep containers cool by spraying with water.
Retain contaminated extinguishing water; do not allow entering into the sewage system.
In the case of larger fires: Cordon affected area.

Special protective equipment
Self-contained respiratory protective device.

6. **ACCIDENTAL RELEASE MEASURES**

6.1 Personal precautions, protective equipment and emergency procedures

Information for non-emergency personnel
In the case of large quantities: Use filter respirator for organic vapours (filter type A).
Use personal protective equipment to avoid any contamination of skin, eyes and personal clothes. Remove potential sources of ignition. Do not smoke.
Assure sufficient ventilation.

Information for emergency responders
If available, observe corporate hazard-control and emergency plans.

6.2 Environmental precautions

In the case of spills: Avoid penetration into the sewage canal, surface water and ground water.
In the case of accidental release: Do not discharge in surface water, sewers or soil.

6.3 Methods and material for containment and cleaning up

Advice on spillage containment
Take up small amounts spilled product with an inert absorbent. Dispose of as hazardous waste.
Dam spilled substance in and suck carefully; recycle if possible.

Appropriate clean-up procedures
Collect remainder in inert absorbent and dispose of as hazardous waste. Wash away remainder with water.

Inappropriate containment or clean-up techniques
None known.

6.4 Reference to other sections
See also the sections 8 and 13.

7. **HANDLING AND STORAGE**

7.1 Precautions for safe handling

Recommendations for safe handling
Use only in well ventilated areas.
Only transfer into suited and resistant containers. Containers have to be properly
Safety Data Sheet according to Regulation (EC) No 453/2010

Furfuryl alcohol

labelled.
Above 65 °C: use in a closed system.

Advice on general occupational hygiene
The usual precautionary measures when handling chemicals have to be observed. Do not eat, drink and smoke in work areas. Wash hands thoroughly with water and soap.

7.2 Conditions for safe storage, including any incompatibilities
Protection against incompatible substances
Keep away from oxidants and strong acids. The substance affects many synthetic materials; store only in original packing.
Keep container tightly closed.

Protection against ambient influences
Protect against heat and solar radiation. Recommended storage temperature: 20 °C.
Store in a dark area.

Maintenance of the integrity of the substance
Not required.

7.3 Specific end use(s)
If used in food: comply with food safety regulation (HACCP).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

<table>
<thead>
<tr>
<th>Country</th>
<th>8 hours (TWA)</th>
<th>Short term (15 min.)</th>
<th>Notation</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>mg/m³</td>
<td>ppm</td>
<td>mg/m³</td>
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<td>5</td>
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<tr>
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<tr>
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<tr>
<td>France</td>
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<tr>
<td>Germany</td>
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<td>10</td>
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<tr>
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<tr>
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<tr>
<td>United Kingdom</td>
<td>n.d. (previous 20 mg/m³)</td>
<td>n.d. (previous 61 mg/m³)</td>
<td></td>
</tr>
</tbody>
</table>

n.d. not determined
The exposure limits may be exceeded before the odour is perceived.

DNEL / DMEL
Workers short term exposition

DNEL_worker (acute, inhalation - systemic) 143 mg/m³
DNEL_worker (acute, inhalation - local) 8 mg/m³

Workers long term exposition

DNEL_worker (long-term, inhalation - systemic) 31 mg/m³
DNEL_worker (long-term, inhalation - local) 8 mg/m³
DNEL_worker (long-term, dermal - systemic) 4 mg/kg bw/day

Consumers short term exposition

DNEL_general population (acute, inhalation - systemic) 128.5 mg/m³
DNEL_general population (acute, inhalation - local) 8 mg/m³
DNEL_general population (acute, oral - systemic) 2.4 mg/kg
Furfuryl alcohol

Consumers long term exposition

DNEL general population (long-term, inhalation - systemic) 9.3 mg/m³
DNEL general population (long-term, inhalation - local) 8 mg/m³
DNEL general population (long-term, oral - systemic) 2.4 mg/kg bw/day
DNEL general population (long-term, dermal - systemic) 2.4 mg/kg bw/day

PNEC
Aquatic
- fresh water PNEC aquatic (freshwater) 0.17 mg/L
- marine water PNEC aquatic (marine water) 0.017 mg/L
- intermittent release PNEC aquatic (intermittent release) 1.7 mg/L

Sedimentary
- fresh water sediment PNEC sediment 0.861 mg/kg sediment dw
- marine water sediment PNEC marine-sediment 0.0861 mg/kg sediment dw

Terrestrial
- soil PNEC soil 0.0724 mg/kg soil dw

Secondary poisoning
- food chain PNEC oral 35.3 mg/kg food

Potential to bioaccumulate in the food chain is not applicable (logPow <3).

8.2 Exposure controls
8.2.1 Appropriate engineering controls
Ventilation and local exhaust.

8.2.2 Individual protection measures, such as personal protective
a) Eye/face protection
Safety goggles (EN166).

b) Skin protection
Hand protection
Gloves butyl rubber 0.7 mm Breakthrough time > 8 hours (EN374)
Gloves neoprene 0.75 mm Breakthrough time > 4 hours (EN374)
Other
Protective clothing.

c) Respiratory protection
In case of insufficient local exhaust: filter respirator for organic vapours (filter type A).

d) Thermal hazards
Not applicable.

8.2.3 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 Information on basic physical and chemical properties

Clear colourless liquid that turns from yellow and brown to dark red on exposure to light and air.

Appearance

Odour
Odour threshold (mg/m³) 33
pH (30% solution) 4 - 6
Melting point / freezing point (°C) – 14.6
Boiling point (°C) at 1013 hPa 171
Flash point (°C) 65 (closed cup)

Evaporation rate (ether=1) 443
Upper / lower explosive limits (vol%) 1.8 - 16.3
Vapour pressure at 20 °C (Pa) 53
Vapour density (air=1) 3.38
Relative density (water=1) 1.13
Solubility(ies)
- Solubility in water at 20 °C (g/l) Miscible
- Solubility in fat Good
Partition coefficient (log K octanol/water) 0.3
Furfuryl alcohol

Auto-ignition temperature (˚C) 490
Decomposition temperature Not available
Viscosity at 25 ˚C (mPa.s) 4.62
Explosive properties Non explosive
Oxidising properties None

9.2 Other information
Miscibility with Solvents (ethanol, benzene, chloroform, ether)
Conductivity (pS/m) Not available.
Heat of combustion (kJ/kg) 26 000
Surface tension at 25 ˚C (mN/m) 38

10. STABILITY AND REACTIVITY
10.1 Reactivity
Risk of polymerization.

10.2 Chemical stability
Discolours on exposure to light. Unstable in water.

10.3 Possibility of hazardous reactions
Exothermic polymerization with explosive violence in the presence of (strong) acids. Reacts violently with oxidants.

10.4 Conditions to avoid
Contact with direct sunlight, heat sources and air. Temperatures in storage > 40 °C should be avoided.

10.5 Incompatible materials
Oxidants (violent reaction) and strong acids (polymerization).

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

11. TOXICOLOGICAL INFORMATION
11.1 Information on toxicological effects
a) Acute Toxicity
   – Oral LD50 (rat) 132 - 275 mg/kg
   – Dermal LD50 (rabbit) 400 - 657 mg/kg
   – Inhalation LC50 (rat, 4 hours) 0.820 – 2.070 mg/L
     NOAEC 0.510 mg/L
b) Skin corrosion/irritation
   The substance is irritating to skin.
c) Serious eye damage/irritation
   The substance is irritating to eyes.
d) Respiratory or skin sensitisation
   No adverse effect observed (not sensitising).
e) Germ cell mutagenicity
   No adverse effect observed (negative).
f) Carcinogenicity
   NOAEL (oral) 53 mg/kg bw/day
   Target organ(s): digestive: liver.
   LOAEC (inhalation) 8 mg/ m³
   Target organ(s): respiratory: nose.
   Suspected of causing cancer. Two-year inhalation carcinogenicity studies provide limited evidence of carcinogenicity at dose levels associated with systemic toxicity and only in tissues which exhibit significant tissue damage (i. e. nose and kidney).
g) Reproductive toxicity
   – Fertility/developmental
     No effect of furfuryl alcohol on estrous cyclicity or on sperm parameters in rats or mice at exposure concentrations of up to 128 mg/m³. Not warranted to be a reprotoxin.
h) Specific target organ toxicity – single exposure
   - 
   Respiratory tract
   The substance may cause respiratory irritation.

i) Specific target organ toxicity – repeated exposure
   - 
   Respiratory tract
   Signs of respiratory tract (specifically nasal) irritation were seen in rats after repeated exposure.

j) Aspiration hazard
   Based on available data, the classification criteria for this hazard class are not met.

11.2 Likely routes of exposure
Furfuryl alcohol can be absorbed via the oral route and via the dermal and inhalation routes. Furfuryl alcohol is extensively and rapidly oxidised to furfural.

12 ECOLOGICAL INFORMATION

12.1 Toxicity
Aquatic compartment and sediment
- Fish
  LC50 (fresh water, 96 h) 362 mg/L (QSAR)
- Aquatic invertebrates
  EC50 (Daphnia, fresh water, 48 h) 224 mg/L (QSAR)
- Algae and aquatic plants
  EC50/LC50 (algae, fresh water, 96 d) 170 mg/L (QSAR)
  NOEC (algae, fresh water, 7 d) 25 mg/L (QSAR)
- Sediment organisms
  Not a relevant compartment.
Terrestrial compartment
  Not a relevant compartment.
Non compartment specific effect relevant for the food chain (secondary poisoning)
- Birds
  No data

12.2 Persistence and degradability
Biodegradability
- Biodegradability in water
  Readily biodegradable.

12.3 Bioaccumulation potential
Aquatic bioaccumulation
  No remarkable bioaccumulation potential (log $K_{ow}$ 0.3).

12.4 Mobility in soil
Adsorption/desorption
  Highly mobile ($K_{oc}$ 34)
Volatilisation
  Henry constant at 20 °C 0.0079 (in Pa m$^3$/mol)

12.5 Results of PBT and vPvB assessment
The substance does not meet the PBT and vPvB criteria according to annex XIII of Regulation (EC) No 1907/2006.

12.6 Other information
Biochemical oxygen demand
  BOD (14 days) 77.7% degradation
Water hazard class (WGK Germany)
  1 (slightly hazardous to water)

13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Product disposal
  Recycling by distillation.
  Removal to an authorized waste incinerator for solvents or as chemical waste in accordance with local regulations. Do not discharge wastewater into sewer.

Packaging disposal
  Uncleaned empty package have to be treated like the content. The labelling of
Furfuryl alcohol

uncleaned containers must not be removed.

Waste treatment-relevant information
European waste list (EURAL) 07 01 04

14 TRANSPORT INFORMATION
14.1 UN No. 2874
14.2 UN proper shipping name FURFURYL ALCOHOL
14.3 Transport hazard class(es) 6.1
14.4 Packinggroup III
14.5 Environmental hazards
Marine pollutant No
14.6 Specials precautions for user
Classification code T1
Risk label(s) 6.1
Tunnel category (E)
Hazard Identification Number (Kemler code) 60
Limited quantity (LQ) 5 L
Excepted quantity E1
ERICard 6-03
Emergency Schedules (EmS)
  Fire schedule Alfa (F - A)
  Spillage schedule Alfa (S - A)
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Ship type required 3
Pollution category Y

15 REGULATORY INFORMATION
15.1 Safety, health and environmental regulations / legislation specific for the substance
Approved as a flavouring agent in the EU FL No 13.019 (Regulation (EC) No 2232/96).

15.2 Chemical safety assessment
A Chemical Safety Assessment has been carried out for furfuryl alcohol.

16 OTHER INFORMATION
16.1 Changes to the previous version
Adaptations of toxicological and ecological data because of updated REACH dossier.

16.2 Abbreviations and acronyms
DNEL Derived No Effect Level
DSD / DPD Dangerous Substances Directive / Dangerous Preparations Directive
EC50 Effect Concentration, 50 percent
ERICard Emergency Response Intervention Card
GHS / CLP Globally Harmonised System / Classification, Labelling and Packaging
IC50 Inhibitory Concentration, 50 percent
LC50 Lethal Concentration, 50 percent
LD50 Lethal Dose, 50 percent
LOAEC Lowest observed adverse effect concentration
NOAEC No observed adverse effect concentration
NOAEL No observed adverse effect level
NOEC No observed effect concentration
NOEL No observed effect level
PBT Persistent, Bioaccumulative and Toxic
PNEC Predicted No Effect Concentration
TWA Time Weighted Average
vPvB very Persistent and very Bioaccumulative
16.3 Literature references and sources for data

REACH dossier.

16.4 Full text of indications of danger, R phrases, hazard statements and safety advise which are not written out in full under Sections 2 to 15

R21/22 Harmful in contact with skin and if swallowed.
R23 Toxic by inhalation.
R36/37/38 Irritating to eyes, respiratory system and skin.
R40 Limited evidence of a carcinogenic effect.
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

This data sheet has been compiled by KWA. Despite the careful attention paid to the setting up of the text, KWA cannot be held responsible for any error appearing in the text and resulting in whatever damage it may cause.

KWA, Spijsedijk 18c, 4207 GN Gorinchem, The Netherlands. Phone +31 183 649 556