1. Product and company identification

Product name : Furfuryl alcohol
Synonym : 2-hydroxymethylfuran; 2-furymethanol; 2-furancarbinol; furfuralcohol; 2-furyl carbinol; 2-hydroxymethyl furan; a-furyl carbinol; a-furancarbinol; a-hydroxymethylfuran; nci-c56224
Material uses : Applications in resins, foundry, colour, lac, synthetic and electro industry. Further applications in pharmaceutical products.
Supplier : IFC NORTH AMERICA inc. 63 Church Street, Suite 403, St. Catharines, ON Canada L2R 3C4
Manufacturer : TRANS FURANS CHEMICALS bvba, Industriepark Leukaard 2, 2440 Geel, Belgium
MSDS authored by : KMK Regulatory Services inc.
Product type : Liquid.

2. Hazards identification

Emergency overview
Color : Colorless to light yellow.
Physical state : Liquid.
Odor : Mild.
Signal word : DANGER!
Hazard statements : COMBUSTIBLE LIQUID AND VAPOR. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. CAUSES EYE AND SKIN IRRITATION. CAN CAUSE TARGET ORGAN DAMAGE.
Precautions : Keep away from heat, sparks and flame. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects
Inhalation : Harmful by inhalation.
Ingestion : May be fatal if swallowed.
Skin : Irritating to skin. Harmful in contact with skin.
Eyes : Irritating to eyes.
Potential chronic health effects
Chronic effects : Can cause target organ damage.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.
Target organs : Causes damage to the following organs: upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.
Over-exposure signs/symptoms
Inhalation : No specific data.
2. Hazards identification

**Ingestion**: No specific data.

**Skin**: Adverse symptoms may include the following:
- irritation
- redness

**Eyes**: Adverse symptoms may include the following:
- pain or irritation
- watering
- redness

**Medical conditions aggravated by over-exposure**: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

3. Composition/information on ingredients

**United States**

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furfuryl alcohol</td>
<td>98-00-0</td>
<td>60 - 100</td>
</tr>
</tbody>
</table>

**Canada**

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furfuryl alcohol</td>
<td>98-00-0</td>
<td>60 - 100</td>
</tr>
</tbody>
</table>

**Mexico**

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>%</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furfuryl alcohol</td>
<td>98-00-0</td>
<td>60 - 100</td>
<td>UN2874 75 ppm H 2 F 2 R 0 Special</td>
</tr>
</tbody>
</table>

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

**Eye contact**: Immediately flush eyes with plenty of water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.

**Skin contact**: In case of contact, immediately flush skin with plenty of water for at least 20 minutes. Call medical doctor or poison control center immediately. Get medical attention.

**Inhalation**: Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Call medical doctor or poison control center immediately.

**Ingestion**: Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Call medical doctor or poison control center immediately.

**Protection of first-aiders**: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

**Notes to physician**: Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
5. Fire-fighting measures

Flammability of the product: Combustible liquid. Vapor may cause flash fire. The vapor/gas is heavier than air and will spread along the ground.

Extinguishing media

Suitable: Use dry chemical, CO₂, water spray (fog) or foam.

Not suitable: Do not use water jet.

Special exposure hazards: Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous decomposition products: Decomposition products may include the following materials:
- carbon dioxide
- carbon monoxide

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions: Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill: Stop leak if without risk. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill: Stop leak if without risk. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling: Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
7. Handling and storage

Storage: Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

United States

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furfuryl alcohol</td>
<td>ACGIH TLV (United States, 1/2009). Absorbed through skin. STEL: 60 mg/m³ 15 minute(s). TWA: 40 mg/m³ 8 hour(s). W: 10 ppm 8 hour(s). NIOSH REL (United States, 6/2009). Absorbed through skin. STEL: 60 mg/m³ 15 minute(s). TWA: 40 mg/m³ 10 hour(s). W: 10 ppm 10 hour(s). OSHA PEL (United States, 11/2006). W: 200 mg/m³ 8 hour(s). TWA: 10 ppm 8 hour(s).</td>
</tr>
</tbody>
</table>

Canada

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Occupational exposure limits</th>
<th>TWA (8 hours)</th>
<th>STEL (15 mins)</th>
<th>Ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furfuryl alcohol</td>
<td>US ACGIH 1/2009</td>
<td>10</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>AB 4/2009</td>
<td>10</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>BC 9/2009</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>ON 8/2008</td>
<td>10</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>QC 6/2008</td>
<td>10</td>
<td>40</td>
<td>-</td>
</tr>
</tbody>
</table>


Mexico

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furfuryl alcohol</td>
<td>NOM-010-STPS (Mexico, 9/2000). Absorbed through skin. LMPE-CT: 60 mg/m³ 15 minute(s). LMPE-CT: 15 ppm 15 minute(s). LMPE-PPT: 40 mg/m³ 8 hour(s). LMPE-PPT: 10 ppm 8 hour(s).</td>
</tr>
</tbody>
</table>

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures: Personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures: Ensure that eyewash stations and safety showers are close to the workstation location. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.

Personal protection
8. Exposure controls/personal protection

Respiratory: 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. Recommended: Wear an appropriate NIOSH approved respirator if concentration levels exceed the safe exposure limits.

Hands: Use gloves appropriate for work or task being performed. Recommended: Natural rubber (latex).

Eyes: Safety eyewear should be used when there is a likelihood of exposure. Recommended: Safety glasses with side shields.

Skin: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: Lab coat.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Liquid.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>Open cup: 74.85°C (166.7°F) (Cleveland.).</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>490.55°C (915°F)</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless to light yellow.</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild.</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>98.11 g/mole</td>
</tr>
<tr>
<td>Molecular formula</td>
<td>C₅H₆O₂</td>
</tr>
<tr>
<td>Boiling/condensation point</td>
<td>171°C (339.8°F)</td>
</tr>
<tr>
<td>Melting/freezing point</td>
<td>-14.44°C (6°F)</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.1282 g/cm³</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.13</td>
</tr>
<tr>
<td>Vapor density</td>
<td>3.4 [Air = 1]</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>0.04 (butyl acetate = 1)</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

Chemical stability: The product is stable.

Conditions to avoid: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Materials to avoid: Reactive or incompatible with the following materials: oxidizing materials.

Hazardous decomposition products: Decomposition products may include the following materials: carbon dioxide, carbon monoxide.

Possibility of hazardous reactions: Hazardous reactions or instability may occur under certain conditions of storage or use.

Hazardous polymerization: Yes. Exothermic polymerization with explosive violence in presence of acids.
11. Toxicological information

**Acute toxicity**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furfuryl alcohol</td>
<td>LC50 Inhalation Gas.</td>
<td>Rat</td>
<td>233 ppm</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>400 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Dermal</td>
<td>Rat</td>
<td>3825 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>177 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

**Chronic toxicity** : No specific data.

**IDLH** : 75 ppm

12. Ecological information

**Environmental effects** : Not established

**Other adverse effects** : No known significant effects or critical hazards.

13. Disposal considerations

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. This material and its container must be disposed of in a safe way. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Empty containers or liners may retain some product residues. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

<table>
<thead>
<tr>
<th>Regulatory information</th>
<th>UN number</th>
<th>Proper shipping name</th>
<th>Classes</th>
<th>PG*</th>
<th>Label</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOT Classification</strong></td>
<td>UN2874</td>
<td>FURFURYL ALCOHOL</td>
<td>6.1</td>
<td>III</td>
<td></td>
<td>Limited quantity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Packaging instruction</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Passenger aircraft</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Quantity limitation: 60 to 60 L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Cargo aircraft</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Quantity limitation: 220 to 220 L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Special provisions</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IB3, T4, TP1</td>
</tr>
<tr>
<td><strong>TDG Classification</strong></td>
<td>UN2874</td>
<td>FURFURYL ALCOHOL</td>
<td>6.1</td>
<td>III</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mexico Classification</strong></td>
<td>UN2874</td>
<td>FURFURYL ALCOHOL</td>
<td>6.1</td>
<td>III</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IMDG Class</strong></td>
<td>UN2874</td>
<td>FURFURYL ALCOHOL</td>
<td>6.1</td>
<td>III</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
14. Transport information

| IATA-DGR Class | UN2874 | FURFURYL ALCOHOL | 6.1 | III |

PG*: Packing group
Exemption to the above classification may apply.

AERG: 153

15. Regulatory information

**United States**

**HCS Classification**
- Combustible liquid
- Highly toxic material
- Irritating material
- Target organ effects

**U.S. Federal regulations**
- United States inventory (TSCA 8b): This material is listed or exempted.
  - SARA 302/304/311/312 extremely hazardous substances: No products were found.
  - SARA 302/304 emergency planning and notification: No products were found.
  - SARA 302/304/311/312 hazardous chemicals: Furfuryl alcohol
  - SARA 311/312 MSDS distribution - chemical inventory - hazard identification:
    - Furfuryl alcohol: Fire hazard, reactive, Immediate (acute) health hazard, Delayed (chronic) health hazard

- Clean Water Act (CWA) 307: No products were found.
- Clean Water Act (CWA) 311: No products were found.
- Clean Air Act (CAA) 112 accidental release prevention: No products were found.
- Clean Air Act (CAA) 112 regulated flammable substances: No products were found.
- Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

**Clean Air Act**

- Section 112(b) Hazardous Air Pollutants (HAPs): Not listed
- Section 602 Class I Substances: Not listed
- Section 602 Class II Substances: Not listed

**DEA List**

- List I Chemicals (Precursor Chemicals): Not listed
- List II Chemicals (Essential Chemicals): Not listed

**State regulations**

- Connecticut Carcinogen Reporting: This material is not listed.
- Connecticut Hazardous Material Survey: This material is not listed.
- Florida substances: This material is not listed.
- Illinois Chemical Safety Act: This material is not listed.
- Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.
- Louisiana Reporting: This material is not listed.
- Louisiana Spill: This material is not listed.
- Massachusetts Spill: This material is not listed.
- Massachusetts Substances: This material is listed.
- Michigan Critical Material: This material is not listed.
- Minnesota Hazardous Substances: This material is not listed.
- New Jersey Hazardous Substances: This material is listed.
- New Jersey Spill: This material is not listed.
- New Jersey Toxic Catastrophe Prevention Act: This material is not listed.
15. Regulatory information

New York Acutely Hazardous Substances: This material is not listed.
New York Toxic Chemical Release Reporting: This material is not listed.
Pennsylvania RTK Hazardous Substances: This material is listed.
Rhode Island Hazardous Substances: This material is not listed.

California Prop. 65
No products were found.

Canada

WHMIS (Canada):
Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists:
CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Canada inventory: This material is listed or exempted.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Mexico

Classification:

International regulations

International lists:
Australia inventory (AICS): This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.

16. Other information

United States

Label requirements:

Hazardous Material Information System (U.S.A.):
Health: 2  Flammability: 2  Physical hazards: 0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.):
Health: 2  Flammability: 2  Instability: 0

Canada
16. Other information

WHMIS (Canada)

References

Date of issue: 02/01/2010
Date of previous issue: 12/01/2006
Version: 3

Notice to reader
To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.