

# SAFETY DATA SHEET



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## 24-Hour Emergency Number (CHEMTREC)

USA: 800-424-9300  
International: 703-527-3887

All non-emergency numbers should be directed  
to Customer Service at 800-PURITY1

## FURAN

SDS No. M0112

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Furan

Synonyms: Axole, Divinylene Oxide, Oxacyclopentadiene; 1, 4-Epoxy-1, 3-butadiene; Furfuran

Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

### 2. HAZARDS IDENTIFICATION



#### **Classification:**

Flammable Liquids: GHS Category 1

Acute Toxicity, Oral: GHS Category 4

Acute Toxicity, Inhalation: GHS Category 3

Skin Corrosion: GHS Category 2

Germ Cell Mutagenicity: GHS Category 2

Carcinogenicity: GHS Category 1B

Specific Target Organ Toxicity, repeated exposure: GHS Category 2

Acute Aquatic Toxicity: GHS Category 2

Chronic Aquatic Toxicity: GHS Category 2

#### **Label Elements**

Signal Word: DANGER!

#### Hazard Statements:

H224 – Extremely flammable liquid and vapor.

H241 – Heating may cause fire or explosion.

H302 – Harmful if swallowed.

H315 – Causes skin irritation.

H331 – Toxic if inhaled.

H341 – May cause birth defects.

H350 – May cause cancer.

H360 – May damage fertility or the unborn child.

H373 – May cause damage to organs through prolonged or repeated exposure.

Clear focus. Consistent results. Complete confidence.

H411 – Toxic to aquatic life with long lasting effects.

**Precautionary Statements:**

P210 – Keep away from heat/sparks/open flames/hot surfaces – No smoking.

P273 – Avoid release to the environment.

P280 – Wear protective gloves/protective clothing/eye protection/face protection.

P303+P361+P353 – If on skin or hair: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

**Emergency Overview**

Harmful if inhaled or swallowed. Causes irritation to eyes, skin, and respiratory tract. Suspected carcinogen. May cause central nervous system depression. May cause liver damage. Extremely flammable liquid and vapor. Vapor may cause flash fire. Uninhibited material, or form which the inhibitor has been removed or reacted, may form explosive peroxides. Target Organs: Central nervous system, liver, blood forming organs, and adrenal medulla.

**HMIS Rating:**

Health – 2\* Flammability – 4 Physical Hazard – 0 PPE – User supplied

NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

**3. COMPOSITION AND INFORMATION ON INGREDIENTS**

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
Furan	110-00-9	>99%	Yes

**4. FIRST-AID MEASURES**

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Ingestion:** If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

**Skin Contact:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Eye Contact:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

**5. FIRE FIGHTING MEASURES**

**Flammability:** Extremely flammable liquid and vapor (GHS Category 1)

**Auto-ignition Temperature:** 360° C (680° F)

**Flash Point:** -35° C (-31° F)

**Flammable Limits:** Lower Limit – 2.3 vol %, Upper Limit – 14.3 vol %

**Products of Combustion:** Will decompose into highly toxic and irritating gases (carbon monoxide and carbon dioxide) under fire conditions.

**Specific Fire Hazards:** As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Will be easily ignited by heat, sparks or flame. Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Specific Explosion Hazards:** May form explosive peroxides. Vapors may form explosive mixture with air. Containers may explode in the heat of a fire.

**Fire Fighting Media:** Water may be ineffective. Use dry chemical or foam.

**National Fire Protective Association:** (estimated) Health - 2, Flammability - 4, Reactivity - 1

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

## 6. ACCIDENTAL RELEASE MEASURES

Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Provide ventilation to the affected area and remove all ignition sources. Avoid run-off into storm sewers and ditches that lead to waterways. Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Use only non-sparking tools and equipment. A vapor suppressing foam may be used. Always use proper personal protective equipment as described in section 8.

## 7. HANDLING AND STORAGE

Precautions: Wash thoroughly after handling. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. If peroxide formation is suspected, do not open or move container. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Do not distill since this removes peroxide-inhibitors. Use only with adequate ventilation.

Storage: Keep in a flammables area away from heat, sparks, flame, and all sources of ignition. Keep in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from light under an inert atmosphere. Regularly check inhibitor levels to maintain peroxide levels below 1%. After opening, purge container with nitrogen before reclosing. Periodically test for peroxide formation on long-term storage. Addition of water or appropriate reducing materials will lessen peroxide formation.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protection: Wear protective chemical goggles or appropriate eye protection. Use appropriate protective gloves and protective clothing to prevent skin exposure. Chemical-resistant nitrile gloves should be used during routine handling. Disposable nitrile gloves may be recommended for intermittent use. PVC, Neoprene, Viton, Butyl, or natural rubber gloves are not recommended. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Exposure Limits:

ACGIH – None listed

NIOSH – None listed

OSHA Final PELs – None listed

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear, colorless liquid.

Odor: Pleasant, ether-like odor

Molecular Formula: C<sub>4</sub>H<sub>4</sub>O

Molecular Weight: 68.08

Auto-ignition Temperature: 360° C (680° F)

Flash Point: -35° C (-31° F)

Flammable Limits: Lower Limit – 2.3 vol %, Upper Limit – 14.3 vol %

pH: Not available.

Boiling Point: 33.3° C @ 760 mm Hg

Freezing/Melting Point: -85.6° C  
Decomposition Temperature: Not available  
Specific Gravity: 0.93 g/ml  
Vapor Density (Air=1): 2.3  
Vapor Pressure: 600 mm Hg @ 25° C.  
Evaporation Rate (Butyl Acetate = 1): Not available  
Viscosity: 0.38 cp @ 20° C  
Solubility: Insoluble

## 10. STABILITY AND REACTIVITY

Stability: May form peroxides in the absence of inhibitors. May discolor on exposure to air. Under normal storage conditions, peroxidizable compounds can form and accumulate peroxides which may explode when subjected to heat or shock. This material is most hazardous when peroxide levels are concentrated by distillation or evaporation.

Conditions to Avoid: Light, ignition sources, excess heat, evaporating to near dryness, prolonged exposure to air.

Incompatibility With Various Substances: Strong oxidizing agents, strong acids, oxygen.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, peroxides.

Hazardous Polymerization: Has not been reported.

## 11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact

Acute Exposure Hazards:

INHALATION HAZARD: Harmful if inhaled. Irritation may lead to chemical pneumonitis and pulmonary edema. Vapors may cause dizziness or suffocation. May cause nausea, dizziness, and headache. Inhalation may cause respiratory tract irritation, oppression in the chest, dyspnea (labored breathing), central nervous system depression, and temporary visual disturbances. Exposure to high concentrations may produce narcosis, nausea and loss of consciousness. Dogs and rabbits collapsed and died after two inhalations from a saturated cotton wad.

INGESTION HAZARD: Harmful if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause liver damage. Possible aspiration hazard.

SKIN CONTACT HAZARD: Causes skin irritation. May be absorbed through the skin in harmful amounts. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.

EYE CONTACT HAZARD: May cause eye irritation. At high concentrations may cause lacrimation (tearing) and irritation.

Chronic Exposure Hazards: Chronic exposure may cause liver damage. Furan fed to mice and rats by gavage causes liver and bile duct damage.

Animal Toxicity:

Inhalation, rat: LC50 = 3398 ppm/1H;

Oral, rat: LD50 = 200-2000 mg/kg;

Intraperitoneal, rat: LD50 = 5.3 mg/kg;

Intraperitoneal, mouse: LD50 = 7 mg/kg;

Carcinogenicity: ACGIH: Not listed; California: carcinogen, initial date 10/1/93; NTP: Suspect carcinogen; IARC: Group 2B carcinogen

Epidemiology: No information found.

Teratogenicity: No information found.

Reproductive Effects: Some effects have been observed.

Mutagenicity: Short-term tests for genotoxicity of furan in mammalian cells are inconclusive. Furan added to cell cultures at doses that resulted in time-averaged effective concentrations of up to 3100 microM was neither cytotoxic nor genotoxic.

Neurotoxicity: No information found.

## 12. ECOLOGICAL INFORMATION

Ecotoxicity: Fish: Fathead minnow: LC50 – 61 mg/L, 96H

Environmental Fate: Rapidly volatilizes into atmosphere. Because of its volatility, there is a very low potential for bioconcentration or biodegradation.

### 13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements. This material is a "U" listed waste (U124).

### 14. TRANSPORT INFORMATION

#### US DOT

Proper Shipping Name: Furan

Hazard Class: 3

UN Number: UN2389

Packing Group: I

#### IMDG

Proper Shipping Name: Furan

Hazard Class: 3

UN Number: UN2389

Packing Group: I

#### IATA

Proper Shipping Name: Furan

Hazard Class: 3

UN Number: UN2389

Packing Group: I

### 15. REGULATORY INFORMATION

#### US Federal Regulations:

CERCLA Hazardous Substances: CAS# 110-00-9 – 100 lb final RQ; 45.4 kg final RQ

SARA Section 302: CAS# 110-00-9 – 500 lb final TPQ

SARA Codes: CAS# 110-00-9 – immediate, delayed, fire

Section 313: Furan (CAS# 110-00-9) is not subject to SARA Title III reporting requirements.

OSHA: Considered highly hazardous by OSHA.

#### US State Regulations:

CAS# 110-00-9 is on the following state right-to-know lists: New Jersey, Pennsylvania, and Massachusetts

California Prop 65: WARNING! This product contains furan, a chemical known to the State of California to cause cancer.

### 16. OTHER INFORMATION

Originally Prepared: 10/24/2006

Last Revised: 9/26/2014 – Updated pictograms, hazard categories, hazard statements, and precautionary statements in Section 2. Updated toxicity information in Section 11. Updated ecotoxicity information in Section 12.

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sources to assure proper use and disposal of these materials and the safety and health of employees and customers and the protection of the environment.

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