Material Safety Data Sheet

Date Printed: 31/MAY/2005
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Version 1.5
According to 91/155/EEC

Classified as Hazardous according to the criteria of EU Annex 1 and NOHSC.

1 - Product and Company Information

Product Name	TETRAHYDROFURAN, 99.5+% (INHIBITED WITH 0.025% BHT)
Product Number	147222
Company	Sigma-Aldrich Pty, Ltd Unit 2, 14 Anella Avenue Castle Hill NSW 1765 Australia
Technical Phone #	+61 2 9841 0555
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2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
TETRAHYDROFURAN WITH INHIBITOR	109-99-9	203-726-8	603-025-00-0

Formula	C4H8O
Molecular Weight	72.11 AMU
Synonyms	Agrisynth THF * Butane, 1,4-epoxy- * Butane, alpha,delta-oxide * Cyclotetramethylene oxide * Diethylene oxide * 1,4-Epoxybutane * Furanidine * NCI-C60560 * Oxacyclopentane * Oxolane * RCRA waste number U213 * Tetrahydrofuraan (Dutch) * Tetrahydrofuran (ACGIH:OSHA) * Tetrahydrofuranne (French) * Tetraidrofurano (Italian) * Tetramethylene oxide

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Highly flammable. May form explosive peroxides. Irritating to eyes and respiratory system.

4 - First Aid Measures

AFTER INHALATION
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

AFTER SKIN CONTACT
In case of contact, immediately wash skin with soap and copious amounts of water.

AFTER EYE CONTACT
In case of contact, immediately flush eyes with copious amounts

of water for at least 15 minutes.

AFTER INGESTION
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

5 - Fire Fighting Measures

EXTINGUISHING MEDIA
Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.
Unsuitable: Water may be effective for cooling, but may not effect extinguishment.

SPECIAL RISKS
Specific Hazard(s): Flammable liquid. Vapor may travel considerable distance to source of ignition and flash back. Emits toxic fumes under fire conditions.
Explosion Hazards: Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

SPECIFIC METHOD(S) OF FIRE FIGHTING
Use water spray to cool fire-exposed containers.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING
Directions for Safe Handling: Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Conditions of Storage: Store under inert gas. Keep tightly closed. Keep away from heat, sparks, and open flame. Store in a cool dry place.
Unsuitable: In the absence of inhibitors, tetrahydrofuran tends to absorb and react with oxygen from the air to form explosive peroxides which may detonate when they become concentrated by evaporation or distillation, are combined with other compounds resulting in an explosive mixture or are disturbed by heat, shock, or friction.

SPECIAL REQUIREMENTS: Store under inert gas. Test for peroxide formation periodically and before distillation. Do not distill to dryness.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS
Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling. Wash contaminated clothing before reuse.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	150
Poland		NDSCh	300
Poland		NDSP	-

EXPOSURE LIMITS - EUROPEAN UNION

Source	Type	Value
OEL	OEL	150 mg/m3
		50 ppm

Remarks: Skin

EXPOSURE LIMITS - DENMARK

Source	Type	Value
OEL	TWA	148 mg/m3
		50 ppm

Remarks: H

EXPOSURE LIMITS - GERMANY

Source	Type	Value
TRGS 900	OEL	150 mg/m3
		50 ppm

Remarks: =2=
Remarks: Y,TRGS 901-92

EXPOSURE LIMITS - NORWAY

Source	Type	Value
	OEL	150 mg/m3
		50 ppm

Remarks: H

EXPOSURE LIMITS - SWITZERLAND

Source	Type	Value
OEL	OEL	150 mg/m3
		50 ppm

Remarks: C M

EXPOSURE LIMITS - UNITED KINGDOM

Source	Type	Value
OEL	OEL	300 mg/m3
		100 ppm
OEL	STEL	599 mg/m3
		200 ppm

Remarks: Skin

PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection: Government approved respirator.

Hand Protection: Compatible chemical-resistant gloves.
Eye Protection: Chemical safety goggles.

9 - Physical and Chemical Properties

Appearance: Physical State: Clear liquid
Color: Colorless

Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	65 - 67 °C	760 mmHg
MP/MP Range	-108 °C	
Flash Point	-17 °C	Method: closed cup
Flammability	N/A	
Autoignition Temp	321 °C	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	Lower: 1.8 % Upper: 11.8 %	
Vapor Pressure	143 mmHg	20 °C
SG/Density	0.889 g/cm3	
Partition Coefficient	N/A	
Viscosity	N/A	
Vapor Density	2.5 g/l	
Saturated Vapor Conc.	N/A	
Evaporation Rate	> 1	
Bulk Density	N/A	
Decomposition Temp.	N/A	
Solvent Content	N/A	
Water Content	N/A	
Surface Tension	N/A	
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:Soluble.	

10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Oxidizing agents, Oxygen.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

STABILIZERS PRESENT
Inhibited with butylated hydroxytoluene (BHT).

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

11 - Toxicological Information

RTECS NUMBER: LU5950000

ACUTE TOXICITY
LD50
Oral
Rat
2,880 mg/kg
LC50
Inhalation

Rat
2,100 ppm

LD50
Oral
Rat
1650 mg/kg

LC50
Inhalation
Rat
21,000 ppm
3H
Remarks: Behavioral:Sleep. Lungs, Thorax, or Respiration:Respiratory stimulation. Gastrointestinal:Nausea or vomiting.

LD50
Intraperitoneal
Rat
2900 MG/KG

LD50
Intraperitoneal
Mouse
1900 MG/KG

LD50
Oral
Guinea pig
2300 mg/kg

SIGNS AND SYMPTOMS OF EXPOSURE

Can cause CNS depression. Exposure can cause: Coughing, chest pains, difficulty in breathing. Exposure to high airborne concentrations can cause anesthetic effects. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

ROUTE OF EXPOSURE

Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation.
Inhalation: Material is irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

TARGET ORGAN INFORMATION

Central nervous system. Liver. Kidneys.

CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Rat
Route of Application: Inhalation
Exposure Time: 6H/2Y
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Kidney, Ureter, Bladder:Tumors.

Mouse

Route of Application: Inhalation
Exposure Time: 6H/2Y
Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 5000 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-19D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Mouse
Dose: 1800 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-17D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

12 - Ecological Information

No data available.

ECOTOXICOLOGICAL EFFECTS
Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 2,160 mg/l

13 - Disposal Considerations

SUBSTANCE DISPOSAL
Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

14 - Transport Information

RID/ADR
UN#: 2056
Class: 3
PG: II
Proper Shipping Name: Tetrahydrofuran

IMDG
UN#: 2056
Class: 3
PG: II
Proper Shipping Name: Tetrahydrofuran
Marine Pollutant: No
Severe Marine Pollutant: No

IATA
UN#: 2056
Class: 3
PG: II
Proper Shipping Name: Tetrahydrofuran

Inhalation Packing Group I: No

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES

ANNEX I INDEX NUMBER: 603-025-00-0

INDICATION OF DANGER: F Xi

Highly Flammable. Irritant.

R-PHRASES: 11 19 36/37

Highly flammable. May form explosive peroxides. Irritating to eyes and respiratory system.

S-PHRASES: 16 29 33

Keep away from sources of ignition - no smoking. Do not empty into drains. Take precautionary measures against static discharges.

COUNTRY SPECIFIC INFORMATION

Germany

WGK: 1

SWITZERLAND

SWISS POISON CLASS: 3

16 - Other Information

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

DISCLAIMER

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