

# Material Safety Data Sheet

Version 1.9  
Revision Date 01/26/2006MSDS Number 30000006571  
Print Date 01/26/2006

## 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 50% Deoxo-Fluor™ in THF

Company : Air Products and Chemicals, Inc  
7201 Hamilton Blvd.  
Allentown, PA 18195-1501

Telephone : 1-800-345-3148 Chemicals  
1-800-752-1597 Gases and Electronic Chemicals

Emergency telephone number : 800-523-9374 USA  
01-610-481-7711 International

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration (Weight)
Tetrahydrofuran ( thf )	109-99-9	50 %
SULFUR, TRIFLUOR [2-METHOXY-N-(2-METHOXYETHYL) ETHANAMINATO-k N]-, (T-4)	202289-38-1	50 %

## 3. HAZARDS IDENTIFICATION

### Emergency Overview

Corrosive.  
Keep away from heat and sources of ignition.  
Components of the product may affect the nervous system.  
Flammable.  
Severe respiratory irritant.  
Severe skin irritant.  
Severe eye irritant.  
Reacts violently with water.  
Toxic if swallowed.

### Potential Health Effects

Inhalation : Inhalation of aerosol may cause irritation to the upper respiratory tract. Risk of serious damage to the lungs (by inhalation). May cause nose, throat, and lung irritation. Can cause severe eye, skin and respiratory tract burns. May cause central nervous system effects, such as headache, nausea, dizziness, confusion, breathing difficulties. Severe cases of overexposure can result in respiratory failure. Inhalation of vapors and/or aerosols in high concentration may cause irritation of respiratory system.

Eye contact : Causes eye burns. May cause blindness. Severe eye irritation.

Skin contact : Causes skin burns. If absorbed through the skin, may cause central nervous system effects, such as headache, nausea, dizziness, confusion, breathing

# Material Safety Data Sheet

Version 1.9  
Revision Date 01/26/2006

MSDS Number 300000006571  
Print Date 01/26/2006

difficulties.

Ingestion : If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach. May cause central nervous system effects, such as headache, nausea, vomiting, abdominal pain, dizziness, confusion, breathing difficulties. Severe cases of overexposure can result in respiratory failure. May be fatal if swallowed. Toxic if swallowed.

Chronic Health Hazard : Prolonged contact may result in chemical burns and permanent damage. Repeated and/or prolonged exposures may result in: Muscular dysfunction.

## Exposure Guidelines

Target Organs : Respiratory system.  
Skin.  
Eyes.  
Central nervous system.

Symptoms : Repeated and/or prolonged exposure to low concentrations of vapors and/or aerosols may cause: Sore throat. Irritating to eyes and respiratory system. Breathing difficulties. Symptoms may be delayed.

## Aggravated Medical Condition

Asthma. Eye disease Skin disorders and Allergies. Neurological disorders

---

## 4. FIRST AID MEASURES

General advice : Prompt medical attention is required in all cases of overexposure. The potential for hydrogen fluoride formation exists with every exposure, therefore its toxicity must also be considered.

Eye contact : Hold eyelids apart, initiate and maintain gentle and continuous irrigation until the patient receives medical care. If medical care is not promptly available, continue to irrigate for one hour. Seek medical treatment immediately. Trained personnel should administer 1% calcium gluconate solution by continuous drip.

Skin contact : Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay. Initiate and maintain gentle and continuous irrigation until the patient receives medical care. If medical care is not promptly available, continue to irrigate for one hour. Cover wound with sterile dressing. With gloved hand apply 2.5% calcium gluconate gel to the burn area. Alternative treatment is to soak the affected areas in an iced 0.13% water solution (1:750) of Zephiran® chloride (benzalkonium chloride solution, NF). Use ice cubes, not shaved ice, to prevent frostbite. If soaking is impractical, soaks or compresses may be used. (Do not use Zephiran® for burns of the eye.) If immersion is impractical, soaked compresses of the same solution should be applied to the area. Immersion or compresses must be used continuously for two hours. Burns covering an area greater than fifty-two square centimeters (8 square inches) require immediate treatment by a medical doctor.

Ingestion : If a person vomits when lying on his back, place him in the recovery position. Never give anything by mouth to an unconscious person. Do not induce

# Material Safety Data Sheet

Version 1.9  
Revision Date 01/26/2006

MSDS Number 300000006571  
Print Date 01/26/2006

vomiting.

Inhalation : If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. A physician should be consulted for all exposures. Mouth to mouth resuscitation is not recommended. In case of shortness of breath, give oxygen. As soon as possible give 2.5% to 3% calcium gluconate solution by nebulizer.

## Notes to physician

Treatment : If pain persists after above topical treatments, it may be necessary to inject 5% aqueous calcium gluconate beneath, around and into the burn area. This will more likely be necessary in the treatment of extensive burns or small burns where treatment has been delayed. Do not use local anesthetics. Resolution of pain is means to determine effective medical treatment. The patient should be observed for clinical symptoms of hypocalcemia following ingestion or inhalation or following extensive burns. Serum calcium, potassium and magnesium determinations must be performed immediately and periodically to monitor for hypocalcemia and electrolyte imbalance. EKGs should be done immediately and periodically to monitor for arrhythmias, hypocalcemia and hyperkalemia. If additional information is needed call the Air Products' Emergency Number (Section 1) or consult the Air Products' Safetygram 29 "Treatment Protocol for Hydrofluoric Acid Burns."

## 5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media : For smaller fires, use dry chemical or carbon dioxide, do not use water. For large fires, flood fire area with water from as far as possible, using a protective barrier and appropriate personal protective equipment.
- Extinguishing media which must not be used for safety reasons : Water.  
Alcohol-resistant foam.
- Specific hazards : Incomplete combustion may form carbon monoxide. Fire or intense heat may cause violent rupture of packages. Flash back possible over considerable distance. May form explosive mixtures in air. Downwind personnel must be evacuated. Burning produces obnoxious and toxic fumes. Reacts violently with water.
- Special protective equipment for fire-fighters : Avoid contact with the skin. A face shield should be worn.
- Further information : Do not allow run-off from fire fighting to enter drains or water courses.

## 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Use self-contained breathing apparatus and chemically protective clothing. Wear suitable protective clothing, gloves and eye/face protection. Remove all sources of ignition.
- Environmental precautions : Shut off or remove all ignition sources. Construct a dike to prevent spreading. Prevent spilled product from entering streams or drinking water supplies. Local authorities should be advised if significant spillages cannot be contained.

# Material Safety Data Sheet

Version 1.9  
Revision Date 01/26/2006

MSDS Number 300000006571  
Print Date 01/26/2006

- Methods for cleaning up : Approach suspected leak areas with caution. Contact Air Products' Emergency Response Center for advice. Absorb with inert absorbent materials such as: Dry sand. Vermiculite. Activated charcoal. Polypropylene.
- Additional advice : Open enclosed spaces to outside atmosphere. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Protect from water.

---

## 7. HANDLING AND STORAGE

### Handling

See "Flammable and Combustible Liquid Code" NFPA No. 30, National Fire Protection Association, Boston, MA. Avoid contact with skin and eyes. Use only in well-ventilated areas. Avoid breathing vapors and/or aerosols. Emergency showers and eye wash stations should be readily accessible. Adhere to work practice rules established by government regulations. Avoid contact with eyes.

### Storage

To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Keep in a dry, cool place. Keep away from Oxidizers. Store in an area suitable for water reactive materials. Minimize exposure to air. Exposure may cause material to degrade. Store under a nitrogen atmosphere.

### Technical measures/Precautions

Keep away from open flames, hot surfaces and sources of ignition.

---

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### Engineering measures

Use explosion-proof equipment.

### Personal protective equipment

- Respiratory protection : Wear appropriate respirator when ventilation is inadequate. Use Air Purifying Respirator with organic vapor cartridges when exposure is likely.
- Hand protection : Polyvinyl Alcohol Gloves (PVA).  
Nitrile rubber.  
Impervious gloves.
- Eye protection : Full face shield with goggles underneath.  
Chemical resistant goggles must be worn.
- Skin and body protection : Slicker Suit.  
Impervious clothing.  
Full rubber suit (rain gear).  
Rubber or plastic boots.  
Long sleeve shirts and trousers without cuffs.

# Material Safety Data Sheet

Version 1.9  
Revision Date 01/26/2006

MSDS Number 300000006571  
Print Date 01/26/2006

Environmental exposure controls : Shut off or remove all ignition sources. Construct a dike to prevent spreading. Prevent spilled product from entering streams or drinking water supplies. Local authorities should be advised if significant spillages cannot be contained.

Special instructions for protection and hygiene : Provide readily accessible eye wash stations and safety showers. Wash at the end of each workshift and before eating, smoking or using the toilet.

## Exposure limit(s)

Tetrahydrofuran ( thf )	Time Weighted Average (TWA): ACGIH	50 ppm	-
Tetrahydrofuran ( thf )	Short Term Exposure Limit (STEL): ACGIH	100 ppm	-
Tetrahydrofuran ( thf )	Recommended exposure limit (REL): NIOSH	200 ppm	590 mg/m3
Tetrahydrofuran ( thf )	Short Term Exposure Limit (STEL): NIOSH	250 ppm	735 mg/m3
Tetrahydrofuran ( thf )	PEL: OSHA Z1	200 ppm	590 mg/m3

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Color : Yellow.

Molecular Weight : 108.7 g/mol

Relative density : 0.85 (water = 1)

Vapor pressure : 106.02 mmHg

Density : 53.064 lb/ft3 (0.85 g/cm3) at

Flash point : -17 °C

Autoignition temperature : 321 °C

Upper flammability limit : 11 %(V)

Lower flammability limit : 2 %(V)

Water solubility : Reacts violently with water.  
Reacts violently with water.

## 10. STABILITY AND REACTIVITY

Conditions to avoid : Heat, flames and sparks. Exposure to moisture.

Materials to avoid : Oxidizing agents.  
Humid air.  
Water.  
Alcohols.  
Reacts energetically with water.  
Reaction with water or contaminants or excessive heat may result in sufficient pressure to burst container.

# Material Safety Data Sheet

Version 1.9  
Revision Date 01/26/2006

MSDS Number 300000006571  
Print Date 01/26/2006

Hazardous decomposition products : Carbon monoxide.  
Carbon dioxide (CO2).

Hazardous reactions : Reacts violently with water. May form explosive peroxides., Reacts violently with water.

## 11. TOXICOLOGICAL INFORMATION

### Acute Health Hazard

Ingestion : No data is available on the product itself.

Ingestion - Components  
Tetrahydrofuran ( thf ) LD50 : 1,650 mg/kg Species : Rat.  
SULFUR, TRIFLUOR [2-METHOXY-N-(2-METHOXYETHYL)ETHANAMINATO-k N]-,(T-4) LD50 : > 50 - < 200 mg/kg Species : Rat.

Inhalation : No data is available on the product itself.

Skin. : No data is available on the product itself.

Eye irritation/corrosion : Severe eye irritation.

Acute dermal irritation/corrosion : Severe skin irritation.

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity effects

Aquatic toxicity : No data is available on the product itself.

Toxicity to fish - Components  
Tetrahydrofuran ( thf ) LC50 (96 h) : 2,160 mg/l Species : Fathead minnow (Pimephales promelas).

Toxicity to other organisms : No data available.

### Persistence and degradability

Mobility : No data available.

Bioaccumulation : No data is available on the product itself.

Bioaccumulation - Components  
Tetrahydrofuran ( thf ) Negligible bioaccumulation potential.

## 13. DISPOSAL CONSIDERATIONS

# Material Safety Data Sheet

Version 1.9  
Revision Date 01/26/2006

MSDS Number 300000006571  
Print Date 01/26/2006

Waste from residues / unused products : Ensure all national/local regulations are observed. Contact supplier if guidance is required.

## 14. TRANSPORT INFORMATION

### CFR

Proper shipping name : Flammable liquid, toxic, corrosive, n.o.s. (Bis(2-Methoxyethyl) Aminosulfur Trifluoride, Tetrahydrofuran ( thf ) )  
Class : 3 (6.1, 8)  
UN/ID No. : UN3286  
Packing group : II

### IATA

Proper shipping name : Flammable liquid, toxic, corrosive, n.o.s. (Bis(2-Methoxyethyl) Aminosulfur Trifluoride, Tetrahydrofuran ( thf ) )  
Class : 3 (6.1, 8)  
UN/ID No. : UN3286  
Packing group : II

### IMDG

Proper shipping name : FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. (Bis(2-Methoxyethyl) Aminosulfur Trifluoride, Tetrahydrofuran ( thf ) )  
Class : 3 (6.1, 8)  
UN/ID No. : UN3286  
Packing group : II

### CTC

Proper shipping name : FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S. (Bis(2-Methoxyethyl) Aminosulfur Trifluoride, Tetrahydrofuran ( thf ) )  
Class : 3 (6.1, 8)  
UN/ID No. : UN3286  
Packing group : II

## 15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA) 12(b) Component(s):  
Tetrahydrofuran ( thf )

OSHA Hazard Communication Standard (29 CFR 1910.1200) Hazard Class(es)  
Flammable. Corrosive. Toxic.

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Not on Inventory.
Canada	DSL	Not on Inventory.
Australia	AICS	Not on Inventory.
Japan	ENCS	Not on Inventory.
South Korea	ECL	Not on Inventory.
China	SEPA	Included on Inventory.

# Material Safety Data Sheet

Version 1.9  
Revision Date 01/26/2006

MSDS Number 300000006571  
Print Date 01/26/2006

Philippines	PICCS	Not on Inventory.
-------------	-------	-------------------

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification:  
Acute Health Hazard Fire Hazard.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)  
This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

---

## 16. OTHER INFORMATION

### HMIS Rating

Health : 3  
Flammability : 3  
Physical hazard : 2

Prepared by : Air Products and Chemicals, Inc. Global EH&S Product Safety Department

For additional information, please visit our Product Stewardship web site at  
<http://www.airproducts.com/productstewardship/>