



# Material Safety Data Sheet

## FC13-5114i

1,1,2,2-Tetrafluoroethyl-*iso*-Butyl Ether

Revised 12-August-2009

### 1. PRODUCT AND COMPANY IDENTIFICATION

#### Material Identification

**Product name:** FC13-5114i  
**Chemical name:** 1,1,2,2-Tetrafluoroethyl-*iso*-butyl ether  
**Chemical formula:** (CH<sub>3</sub>)<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>OCF<sub>2</sub>CF<sub>2</sub>H  
C<sub>6</sub>H<sub>10</sub>F<sub>4</sub>O  
**Synonym:** HFE-5114i

#### Company Identification

**Distributor:** **Fluoryx, Inc.**  
1933 Davis St., Suite 293  
San Leandro, CA 94577  
USA

**Emergency call:** +86-1346-4812437  
+1-510-329-2811

### 2. COMPOSITION AND INFORMATION ON COMPONENTS

Material	Molecular Weight	Weight Percent	TSCA Listed	CAS Number
1,1,2,2-Tetrafluoroethyl- <i>iso</i> -butyl ether	174.12	≥ 99 %	No	18180-34-2

### 3. HAZARDS IDENTIFICATION

**Emergency Overview:** Flammable.  
In case of decomposition, releases hydrogen fluoride.

#### Route of Entry

**Inhalation:** Yes  
**Eye contact:** Yes  
**Skin contact:** Yes  
**Ingestion:** Unlikely.

#### Potential Effects of Exposure:

**Skin contact:** In case of repeated contact: dry and chapped skin.  
**Eye contact:** Slight irritation.  
**Ingestion:** No data available for humans.

<b>Inhalation:</b>	No reported cases of intoxication in humans. Risk of moderate consequences experimentally observed or under certain conditions. At high concentrations, risk of narcosis or asphyxia by lack of oxygen.
<b>Carcinogenicity:</b>	None.

#### 4. FIRST AID MEASURES

<b>Skin Contact:</b>	Wash the affected skin with soap and water. Consult a physician in case of persistent pain or redness.
<b>Eye Contact:</b>	Flush with running water for several minutes while keeping the eyelids wide open. Consult an ophthalmologist in case of persistent pain.
<b>Ingestion:</b>	Unknown symptoms: consult a physician for advice.
<b>Inhalation:</b>	Remove the subject from the contaminated area. Administer oxygen or cardiopulmonary resuscitation if necessary. Consult a physician in case of respiratory or nervous symptoms.
<b>If the Subject is Completely Conscious:</b>	Rinse mouth and administer fresh water.
<b>If the Subject is Unconscious:</b>	Not applicable.
<b>Medical Treatment/Notes to Physician:</b>	None.

#### 5. FIRE FIGHTING MEASURES

<b>Flash Point:</b>	4 °C (closed cup)
<b>Auto-Ignition Temperature:</b>	No data
<b>Flammability Limits:</b>	No data
<b>Unusual Fire and Explosion Hazards:</b>	No data
<b>Extinguishing Methods:</b>	Use powder. Foam, AFFF. CO <sub>2</sub> extinguisher. Do not use water extinguisher.
<b>Fire Fighting Procedures</b>	
<b>Specific hazards:</b>	Flammable (see Section 9). Formation of dangerous gas/vapors in case of decomposition (see Section 10). Gas/vapors are heavier than air and so may travel along the ground; remote ignition possible.
<b>Protective measures in case of intervention:</b>	Evacuate all non-essential personnel. Wear self-contained breathing apparatus when in close proximity, or in confined spaces. After intervention, take a shower, remove clothing carefully, clean and check the equipment. Intervention only by capable personnel who are trained and aware of the hazards of the product. When intervention in close proximity, wear acid-resistant over-suit.
<b>Other precautions:</b>	If safe to do so, remove the exposed containers, or cool with large quantities of water. Approach

from upwind. As for any fire, ventilate and clean the rooms before reentry. After the fire, proceed rapidly to clean the surfaces exposed to the fumes in order to limit the damage to the equipment. Avoid propagating the fire when directing the extinguishing means in a jet on the surface of the burning liquid.

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## 6. ACCIDENTAL RELEASE MEASURES

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### Personal Precautions:

Follow the protective measures given in Sections 5 and 8. Keep materials and products away that are incompatible with the product (see Section 10).

Eliminate all sources of ignition, and do not generate flames or sparks. If safe to do so, without overexposing anyone, try to stop the leak. Approach from upwind. Disperse gas/vapors with water spray. Protect intervention team with water spray.

### Environmental Precautions:

Prevent discharges into the environment

### Cleanup Procedures:

If possible, dam large quantities of liquid with sand or earth. Prevent the product from entering sewers or confined places. Place everything in a closed, labeled container compatible with the product. Store the product in a safe and isolated place. For disposal methods, refer to Section 13. Collect the product with suitable means. Clean the area with large quantities of water.

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## 7. HANDLING AND STORAGE

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### Handling:

Carry out industrial operations in closed piping circuits equipment. Operate in a well-ventilated area. Prevent decomposition of product vapors by eliminating contact with hot spots. Keep away from heat sources. Keep away from reactive products (see Section 10). Handle small quantities under a lab hood. Do not use tools that produce sparks. Use only equipment and materials that are compatible with the product.

### Storage:

Store in a ventilated, cool area. Keep away from heat sources. Keep away from reactive products (see Section 10). Provide containment around storage containers and transfer installations.

For bulk storage, consult the producer.

### Specific Uses:

For any particular use, please contact the supplier.

### Other Precautions:

No open flames or sparks, no smoking. Follow the protective measures given in Section 8. Use electrically grounded equipment. Warn people about the dangers of the product. Prevent electrostatic discharges. Provide electrical equipment safety for hazardous locations.

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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<b>Exposure Limit Values:</b>	None listed
<b>Authorized Limit Values:</b>	None listed
<b>Exposure Controls:</b>	Follow the protective measures given in Section 7. Provide premise ventilation. Respect local, state, and national regulations for aqueous emissions
<b>Occupational Exposure Controls:</b>	
<b>Ventilation:</b>	Provide local ventilation suitable for the emission risk.  Respiratory protection: Minimum needed if the local exhaust ventilation is adequate.  Use self-contained breathing apparatus in confined areas and areas with insufficient oxygen.  Use self-contained breathing apparatus in cases of large, uncontrolled emission or in all circumstances when the mask and cartridge do not give adequate protection. Use only respiratory protection that conforms to international and national standards.
<b>Hand protection:</b>	Chemical – resistant protective gloves (Neoprene).
<b>Eye protection:</b>	Wear protective goggles for all industrial operations.
<b>Skin protection:</b>	Overalls. Use apron/boots of butyl rubber if there is risk of splashing.
<b>Other precautions:</b>	Provide shower and eye wash stations.  Consult the industrial hygienist or the safety manager for the selection of personal protective equipment suitable for the working conditions.  Do not smoke, eat, or drink in the working area.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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<b>Appearance</b>	Clear liquid
<b>Color</b>	Colorless
<b>Odor</b>	Ethereal
<b>Melting Point</b>	Not available
<b>Boiling Point</b>	93 °C @ 760 mm Hg
<b>Decomposition Temperature</b>	No data
<b>Flash Point</b>	4 °C Remark: Flammable; Method: closed cup
<b>Vapor Pressure</b>	Not available
<b>Density</b>	1.1018 g/mL at 27 °C
<b>Vapor Density (Air = 1)</b>	> 1

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## 10. STABILITY AND REACTIVITY

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<b>Conditions to Avoid:</b>	Heat/sources of heat.
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<b>Materials and Substances to Avoid:</b>	Oxidizing agents. Metallic powders. Alkaline metals. Metal halides.
<b>Hazardous Decomposition Products:</b>	Hydrogen fluoride. Fluorophosgene.
<b>Hazardous Polymerization:</b>	Will not occur.
<b>Other Information:</b>	The vapor is heavier than air and disperses at ground level.

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## 11. TOXICOLOGICAL INFORMATION

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<b>Acute toxicity:</b>	
<b>Inhalation:</b>	No data
<b>Oral:</b>	No data
<b>Dermal:</b>	No data
<b>Irritation:</b>	No data
<b>Sensitization:</b>	No data
<b>Chronic Toxicity:</b>	No data
<b>Carcinogenic Designation:</b>	No data

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## 12. ECOLOGICAL INFORMATION

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<b>Acute Ecotoxicity:</b>	No data.
<b>Chronic Ecotoxicity:</b>	No data.
<b>Degradation</b>	
<b>Abiotic:</b>	
<b>Air, photolysis:</b>	Ozone Depletion Potential (ODP) = 0 Result: no effect on stratospheric ozone. Reference value for CFC 11: ODP = 1.
<b>Air, greenhouse effect:</b>	Global Warming Potential (GWP) = no data Reference value for carbon dioxide: GWP = 1.
<b>Biotic:</b>	No data.
<b>Potential for bioaccumulation:</b>	No data.

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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Treatment:</b>	Dispose in compliance with local, state, and national regulations. It is recommended to contact the producer for recycling/recovery. Send the product to an authorized industrial waste incinerator. The incinerator must be equipped with a system for the neutralization of HF.
<b>Packaging Treatment:</b>	To avoid treatment, use dedicated containers.
<b>RCRA Hazardous Waste:</b>	Not available

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## 14. TRANSPORT INFORMATION

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<b>Mode</b>	DOT/IMDG/IATA
<b>UN Number</b>	1993
<b>Class (Subsidiary)</b>	3
<b>Proper Shipping Name</b>	Flammable Liquid, N.O.S. (Ethers)
<b>Hazard Label (Subsidiary)</b>	Flammable Liquid

Packing Group  
Shipping Hazard Label:

II



**15. REGULATORY INFORMATION**

**National Regulations (US)**

TSCA Inventory 8(b): No

**SARA Title III Sec. 302/303**

Extremely Hazardous Substances  
(40 CFR 355): No

**SARA Title III Sec. 311/312**

(40 CFR 370):

Hazard Category: Fire hazard

Threshold Planning Quantity: 10,000 lbs

**SARA Title III Sec. 313**

**Toxic Chemical Emissions Reporting**

(40 CFR 372): No

**CERCLA Hazardous Substance**

(40 CFR Part 302)

Listed Substance: No

Unlisted Substance: Yes

Reportable Quantity: No

Characteristic: Ignitability

**State Component Listing:**

State Comment: None identified

**National Regulations (Canada)**

Canadian DSL Registration: No

**WHMIS Classification:**

B2 - Flammable Liquid.  
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**.

**Labeling according to Directive 1999/45/EC.**

Category	ID	Phrase
Symbols	F	Flammable
Phrases S	16	Keep away from sources of ignition --- No smoking

**16. OTHER INFORMATION**

**Ratings:**

**NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)**

Health = 0

Flammability = 4

Instability = 1  
Special = None

**HMIS (HAZARDOUS MATERIAL INFORMATION SYSTEM)**

Health = 0  
Fire = 4  
Reactivity = 1  
PPE = Supplied by User; dependent on local conditions

**Legal Disclaimer:**

For R&D use only. Not for drug, household, or other uses. The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations or mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. Unless noted to the contrary, the technical information applies only to pure product.

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End of MSDS