

### SECTION 1: Identification

#### 1.1. Identification

|                               |   |
|-------------------------------|---|
| Product form                  | : Substance   |
| Substance name                | : Hexafluoropropene oxide   |
| CAS No                        | : 428-59-1  |
| Product code                  | : 2109-2-02   |
| Formula                       | : C3F6O   |
| Synonyms                      | : HFPO, 2-(Trifluoromethyl)trifluorooxirane; Perfluoro-1,2-epoxypropane |
| Other means of identification | : MFCD00005125  |

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

|                              |  |
|------------------------------|--|
| Use of the substance/mixture | : Laboratory chemicals<br>Manufacture of substances<br>Scientific research and development |
|------------------------------|--|

#### 1.3. Details of the supplier of the safety data sheet

SynQuest Laboratories, Inc.  
P.O. Box 309  
Alachua, FL 32615 - United States of America  
T (386) 462-0788 - F (386) 462-7097  
[info@synquestlabs.com](mailto:info@synquestlabs.com) - [www.synquestlabs.com](http://www.synquestlabs.com)

#### 1.4. Emergency telephone number

Emergency number : (844) 523-4086 (3E Company - Account 10069)

### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### Classification (GHS-US)

|                           |   |
|---------------------------|---|
| Simple Asphy              | H380 - May displace oxygen and cause rapid suffocation  |
| Liquefied gas             | H280 - Contains gas under pressure; may explode if heated   |
| Acute Tox. 3 (Inhalation) | H331 - Toxic if inhaled   |
| Skin Irrit. 2             | H315 - Causes skin irritation   |
| Eye Irrit. 2A             | H319 - Causes serious eye irritation  |
| Carc. 2                   | H351 - Suspected of causing cancer  |
| STOT SE 3                 | H335 - May cause respiratory irritation   |
| STOT RE 2                 | H373 - May cause damage to organs (central nervous system) through prolonged or repeated exposure |

Full text of H-phrases: see section 16

#### 2.2. Label elements

##### GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H280 - Contains gas under pressure; may explode if heated  
H315 - Causes skin irritation  
H319 - Causes serious eye irritation  
H331 - Toxic if inhaled  
H335 - May cause respiratory irritation  
H351 - Suspected of causing cancer  
H373 - May cause damage to organs (central nervous system) through prolonged or repeated exposure  
H380 - May displace oxygen and cause rapid suffocation

Precautionary statements (GHS-US) :

P201 - Obtain special instructions before use  
P202 - Do not handle until all safety precautions have been read and understood  
P260 - Do not breathe dust/fume/gas/mist/vapors/spray  
P264 - Wash skin thoroughly after handling  
P271 - Use only outdoors or in a well-ventilated area

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P280 - Wear protective gloves/protective clothing/eye protection/face protection  
P302+P352 - If on skin: Wash with plenty of soap and water  
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing  
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P308+P313 - If exposed or concerned: Get medical advice/attention  
P311 - Call a POISON CENTER or doctor/physician  
P312 - Call a POISON CENTER or doctor/physician if you feel unwell  
P314 - Get medical advice/attention if you feel unwell  
P321 - Specific treatment (see supplemental first aid instructions on this label)  
P332+P313 - If skin irritation occurs: Get medical advice/attention  
P337+P313 - If eye irritation persists: Get medical advice/attention  
P362+P364 - Take off contaminated clothing and wash it before reuse  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed  
P405 - Store locked up  
P410+P403 - Protect from sunlight. Store in a well-ventilated place  
P501 - Dispose of contents/container to an approved waste disposal plant

### 2.3. Other hazards

Other hazards not contributing to the classification : May cause frostbite.

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Substance type : Mono-constituent

| Name  | Product identifier | %      | Classification (GHS-US)   |
|---|--------------------|--------|---|
| Hexafluoropropene oxide<br>(Main constituent) | (CAS No) 428-59-1  | <= 100 | Simple Asphy, H380<br>Liquefied gas, H280<br>Acute Tox. 3 (Inhalation), H331<br>Skin Irrit. 2, H315<br>Eye Irrit. 2A, H319<br>Carc. 2, H351<br>STOT SE 3, H335<br>STOT RE 2, H373 |

Full text of H-phrases: see section 16

### 3.2. Mixture

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures general : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.

First-aid measures after skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

First-aid measures after eye contact : Remove contact lenses, if present and easy to do. Continue rinsing. Immediately flush eyes thoroughly with water for at least 15 minutes. Get immediate medical advice/attention.

First-aid measures after ingestion : Due to its physical form, exposure to this chemical is not likely. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get immediate medical advice/attention.

### 4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

Symptoms/injuries after inhalation : May cause drowsiness or dizziness.

Symptoms/injuries after skin contact : Contact with the liquid may cause cold burns/frostbite.

Symptoms/injuries after eye contact : Direct contact with the liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.

### 4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

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### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media : Alcohol resistant foam. Carbon dioxide. Dry powder. Water spray. Use extinguishing media appropriate for surrounding fire.

#### 5.2. Special hazards arising from the substance or mixture

Fire hazard : Thermal decomposition generates: Carbon oxides. Hydrogen fluoride.  
Explosion hazard : Contains gas under pressure; may explode if heated. Use water spray or fog for cooling exposed containers.

#### 5.3. Advice for firefighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.  
Protection during firefighting : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection".

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate unnecessary personnel. Ensure adequate air ventilation. May cause suffocation by reducing oxygen available for breathing. Do not breathe gas, fumes, vapor or spray.

##### 6.1.1. For non-emergency personnel

Emergency procedures : Only qualified personnel equipped with suitable protective equipment may intervene.

##### 6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".  
Emergency procedures : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.

#### 6.2. Environmental precautions

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

#### 6.3. Methods and material for containment and cleaning up

For containment : Stop leak if safe to do so.  
Methods for cleaning up : Ventilate area.  
Other information : For disposal of solid materials or residues refer to section 13: "Disposal considerations".

#### 6.4. Reference to other sections

No additional information available

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Close valve after each use and when empty.  
Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe fumes, gas, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes.  
Safe handling of the gas receptacle : Securely chain cylinders when in use and protect against physical damage.  
Hygiene measures : Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

#### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.  
Storage conditions : Protect from sunlight. Do not expose to temperatures exceeding 50 °C. Keep container closed when not in use.  
Incompatible materials : Refer to Section 10 on Incompatible Materials.  
Storage area : Store in dry, cool, well-ventilated area.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

No additional information available

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### 8.2. Exposure controls

|                                  |   |
|----------------------------------|---|
| Appropriate engineering controls | : Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Systems under pressure should be regularly checked for leakage. Oxygen detectors should be used when asphyxiating gases may be released. Gas detectors should be used when toxic gases may be released. |
| Hand protection                  | : Protective gloves. 29 CFR 1910.138: Hand Protection.  |
| Eye protection                   | : Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection.  |
| Skin and body protection         | : Wear suitable protective clothing.  |
| Respiratory protection           | : In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection.   |
| Thermal hazard protection        | : Cold insulating gloves.   |
| Other information                | : Safety shoes. 29 CFR 1910.136: Foot Protection.   |

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

|   |                       |
|---|-----------------------|
| Physical state                              | : Gas                 |
| Color                                       | : No data available   |
| Odor  | : No data available   |
| Odor threshold                              | : No data available   |
| pH  | : No data available   |
| Melting point                               | : -144 °C             |
| Freezing point                              | : No data available   |
| Boiling point                               | : -27 °C              |
| Critical temperature                        | : 86 °C               |
| Flash point                                 | : No data available   |
| Relative evaporation rate (butyl acetate=1) | : No data available   |
| Flammability (solid, gas)                   | : No data available   |
| Explosion limits                            | : No data available   |
| Explosive properties                        | : No data available   |
| Oxidizing properties                        | : No data available   |
| Vapor pressure                              | : 84.8 psig (@ 21 °C) |
| Relative density                            | : No data available   |
| Relative vapor density at 20 °C             | : No data available   |
| Specific gravity / density                  | : 1.3 g/ml (@ 25 °C)  |
| Molecular mass                              | : 166.02 g/mol        |
| Solubility                                  | : No data available   |
| Log Pow                                     | : No data available   |
| Auto-ignition temperature                   | : No data available   |
| Decomposition temperature                   | : No data available   |
| Viscosity                                   | : No data available   |
| Viscosity, kinematic                        | : No data available   |
| Viscosity, dynamic                          | : No data available   |

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No additional information available

### 10.2. Chemical stability

The product is stable at normal handling and storage conditions.

### 10.3. Possibility of hazardous reactions

No additional information available

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### 10.4. Conditions to avoid

Protect from sunlight. Do not expose to temperatures exceeding 50 °C. Keep away from heat, sparks and flame.

### 10.5. Incompatible materials

Acids. DMSO. Metals. Oxidizing agents.

### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

|  |  |
|--|--|
| Acute toxicity                                     | : Inhalation: Toxic if inhaled.  |
| Skin corrosion/irritation                          | : Causes skin irritation.  |
| Serious eye damage/irritation                      | : Causes serious eye irritation.   |
| Respiratory or skin sensitization                  | : Not classified   |
| Germ cell mutagenicity                             | : Not classified   |
| Carcinogenicity                                    | : Suspected of causing cancer.   |
| Reproductive toxicity                              | : Not classified   |
| Specific target organ toxicity (single exposure)   | : May cause respiratory irritation.  |
| Specific target organ toxicity (repeated exposure) | : May cause damage to organs (central nervous system) through prolonged or repeated exposure.  |
| Aspiration hazard                                  | : Not classified   |
| Symptoms/injuries after inhalation                 | : May cause drowsiness or dizziness.   |
| Symptoms/injuries after skin contact               | : Contact with the liquid the may cause cold burns/frostbite.  |
| Symptoms/injuries after eye contact                | : Direct contact with the liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation. |

## SECTION 12: Ecological information

### 12.1. Toxicity

No additional information available

### 12.2. Persistence and degradability

No additional information available

### 12.3. Bioaccumulative potential

No additional information available

### 12.4. Mobility in soil

No additional information available

### 12.5. Other adverse effects

No additional information available

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

|                                |   |
|--------------------------------|---|
| Waste treatment methods        | : Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.   |
| Waste disposal recommendations | : Dispose of contents/container in accordance with licensed collector's sorting instructions. |
| Additional information         | : Recycle the material as far as possible.  |

## SECTION 14: Transport information

### Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN3163 Liquefied gas, n.o.s., 2.2

UN-No.(DOT) : UN3163

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Proper Shipping Name (DOT) : Liquefied gas, n.o.s.  
Transport hazard class(es) (DOT) : 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115  
Hazard labels (DOT) : 2.2 - Non-flammable gas



DOT Packaging Non Bulk (49 CFR 173.xxx) : 304  
DOT Packaging Bulk (49 CFR 173.xxx) : 314;315  
DOT Symbols : G - Identifies PSN requiring a technical name  
DOT Special Provisions (49 CFR 172.102) : T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter.  
DOT Packaging Exceptions (49 CFR 173.xxx) : 306  
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 75 kg  
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 150 kg  
DOT Vessel Stowage Location : A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.  
Other information : No supplementary information available.

### TDG

No additional information available

### Transport by sea

UN-No. (IMDG) : 3163  
Proper Shipping Name (IMDG) : LIQUEFIED GAS, N.O.S.  
Class (IMDG) : 2 - Gases

### Air transport

UN-No. (IATA) : 3163  
Proper Shipping Name (IATA) : Liquefied gas, n.o.s.  
Class (IATA) : 2

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### Hexafluoropropene oxide (428-59-1)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

EPA TSCA Regulatory Flag

S - S - indicates a substance that is identified in a proposed or final Significant New Uses Rule.

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

### 15.2. International regulations

#### CANADA

No additional information available

#### EU-Regulations

No additional information available

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### National regulations

#### Hexafluoropropene oxide (428-59-1)

Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Japanese ISHL (Industrial Safety and Health Law)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on the TCSI (Taiwan Chemical Substance Inventory)

### 15.3. US State regulations

#### Hexafluoropropene oxide (428-59-1)

State or local regulations U.S. - New Jersey - Right to Know Hazardous Substance List

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

## SECTION 16: Other information

Full text of H-phrases:

|                           |   |
|---------------------------|---|
| Acute Tox. 3 (Inhalation) | Acute toxicity (inhalation) Category 3                            |
| Carc. 2                   | Carcinogenicity Category 2  |
| Eye Irrit. 2A             | Serious eye damage/eye irritation Category 2A                     |
| Liquefied gas             | Gases under pressure Liquefied gas                                |
| Simple Asphy              | Simple Asphyxiant   |
| Skin Irrit. 2             | Skin corrosion/irritation Category 2                              |
| STOT RE 2                 | Specific target organ toxicity (repeated exposure) Category 2     |
| STOT SE 3                 | Specific target organ toxicity (single exposure) Category 3       |
| H280                      | Contains gas under pressure; may explode if heated                |
| H315                      | Causes skin irritation  |
| H319                      | Causes serious eye irritation                                     |
| H331                      | Toxic if inhaled  |
| H335                      | May cause respiratory irritation                                  |
| H351                      | Suspected of causing cancer                                       |
| H373                      | May cause damage to organs through prolonged or repeated exposure |
| H380                      | May displace oxygen and cause rapid suffocation                   |

NFPA health hazard

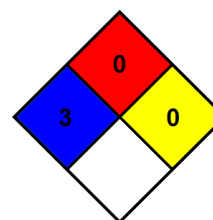
: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard

: 0 - Materials that will not burn.

NFPA reactivity

: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

\* - Chronic (long-term) health effects may result from repeated overexposure

Flammability

: 0 Minimal Hazard - Materials that will not burn

Physical

: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

SDS US (GHS HazCom 2012)

*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 offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable or any damage resulting from handling or from contact with the above product.*