

## FC02-04

## 2-(Perfluorobutyl)ethylene

Revised 10-February-2021

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**1. PRODUCT AND COMPANY IDENTIFICATION**


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**Product Identifier**

Product Name	2-(Perfluorobutyl)ethylene
Catalog Number	FC02-04
Brand	Fluoryx Labs
CAS no.	19430-93-4

**Relevant Identified Uses of the Substance or Mixture and Uses Advised Against**

Identified uses:	Laboratory chemicals. Manufacture of substances
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**Details of the Supplier of the Safety Data Sheet**

Company

**Fluoryx Labs**

3650 Research Way, #22  
 Carson City, NV 89706  
 USA  
 +1 (510) 329-9149 (Telephone)  
 +1 (510) 686-8799 (Fax)  
 www.fluoryx.com

**Emergency call (ChemTel)**

+01-813-248-0585 (International)  
 +1-800-255-3924 (USA)

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**2. HAZARDS INFORMATION**


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**Classification of the Substance or Mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 2)

**GHS Label elements, including precautionary statements**

Pictogram



Signal word

Danger

**Hazard statement(s)**

H225

Highly flammable liquid and vapor.

**Precautionary statement(s)**

P210

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

P233

Keep container tightly closed.

P241

Use explosion-proof electrical/ventilation/lighting/equipment

P242  
P243

Use only non-sparking tools.  
Take precautionary measures against static discharge. P280 Wear protective gloves/ eye protection/ face protection.

Response:

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

Storage:

P403 + P235  
P501

Store in a well-ventilated place. Keep cool. Disposal: Dispose of contents/ container to an approved waste disposal plant.

Other hazards

Inhalation of decomposition products in high concentration may cause shortness of breath (lung edema).

Vapors may form explosive mixture with air.

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### 3. COMPOSITION AND INFORMATION ON INGREDIENTS

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**Synonyms**

3,3,4,4,5,5,6,6-Nonafluoro-1-hexene;  
1-Hexene, 3,3,4,4,5,5,6,6-nonafluoro-;  
ZONYL™ PFBE;  
3,3,4,4,5,5,6,6-Nonafluoro-1-hexen;  
1,1,2-Trihydroperfluoro-1-hexene;  
1H,1H,2H-Nonafluoro-1-hexene

**Chemical formula:**

C<sub>6</sub>H<sub>3</sub>F<sub>9</sub>  
CF<sub>3</sub>CF<sub>2</sub>CF<sub>2</sub>CF<sub>2</sub>CH=CH<sub>2</sub>

**Components**

Material	Molecular Weight	CAS #	EC #	TSCA
2-(Perfluorobutyl)ethylene, ≥ 90 ≤ 100	246.07	19430-93-4	243-053-7	Listed

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### 4. FIRST AID MEASURES

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**General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**If inhaled**

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**

Wash off with soap and plenty of water. Remove contaminated clothing and shoes. Consult a physician.

**In case of eye contact**

Rinse thoroughly with plenty of water as a precaution. Get medical attention if irritation develops and persists.

**If swallowed**

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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### 5. FIREFIGHTING MEASURES

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**Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Unsuitable extinguishing media**

High volume water jet.

**Specific hazards during fire fighting**

Do not use a solid water stream as it may scatter and spread fire.

Flash back possible over considerable distance. Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.

**Specific extinguishing methods**

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.

**Special protective equipment for firefighters**

Wear self contained breathing apparatus for fire fighting.

**Hazardous combustion products**

Hazardous decomposition products formed under fire conditions – carbonyl fluoride, aerosolized particulates, potentially toxic fluorinated compounds, carbon oxides, hydrogen fluoride.

**6. ACCIDENTAL RELEASE MEASURES**

**Personal precautions, protective equipment and emergency procedures**

Remove all sources of ignition. Ventilate the area. Follow safe handling advice and personal protective equipment recommendations.

**Environmental precautions**

Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g., by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

**Methods and materials for containment and cleaning up**

Non-sparking tools should be used. Soak up with inert absorbent material. Suppress (knock down) gases/vapors/mists with a water spray jet.

For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent.

Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.

Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

**7. EXPOSURE CONTROLS AND PERSONAL PROTECTION**

**Components with workplace control parameters:**

Components	CAS-No.	Value type	Control parameters	Basis
3,3,4,4,5,5,6,6,6-Nonafluorohexene	19430-93-4	TWA	100 ppm	USA. ACGIH Threshold Limit Values

**Occupational exposure limits of decomposition products:**

Components	CAS-No.	Value type	Control parameters	Basis
Hydrofluoric acid	7664-39-3	TWA	3 ppm, 2.5 mg/m <sup>3</sup>	NIOSH REL
		C	6 ppm, 5 mg/m <sup>3</sup>	NIOSH REL
		TWA	3 ppm	OSHA Z-2
		TWA	0.5 ppm, (fluorine)	ACGIH
Carbonyl difluoride	353-50-4	C	2 ppm (fluorine)	ACGIH
		TWA	2 ppm	ACGIH
		STEL	5 ppm	ACGIH
		ST	5 ppm, 15 mg/m <sup>3</sup>	NIOSH REL
Carbon dioxide	124-38-9	TWA	2 ppm, 5 mg/m <sup>3</sup>	NIOSH REL
		TWA	5000 ppm	ACGIH
		STEL	30000 ppm	ACGIH
		TWA	5000 ppm, 9000 mg/m <sup>3</sup>	OSHA Z-1
Carbon monoxide	630-08-0	ST	30000 ppm, 54000 mg/m <sup>3</sup>	
		TWA	25 ppm	ACGIH
		TWA	35 ppm, 40 mg/m <sup>3</sup>	NIOSH REL
		C	200 ppm, 229 mg/m <sup>3</sup>	NIOSH REL
		TWA	50 ppm, 55 mg/m <sup>3</sup>	OSHA Z-1

**Engineering measures**

Processing may form hazardous compounds (see section 10)

**Personal protective equipment****Respiratory protection**

General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

**Hand protection**

Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Take note that the product is flammable, which may impact the selection of hand protection. Wash hands before breaks and at the end of workday.

**Eye protection**

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin and body protection**

Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential. Wear the following personal protective equipment: If assessment demonstrates that there is a risk of explosive atmospheres or flash fires, use flame retardant

antistatic protective clothing. Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc.).

### Hygiene measures

If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

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## 8. PHYSICAL AND CHEMICAL PROPERTIES

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### Appearance

Form	Liquid
Color	Colorless

### Safety Data

pH	No data available
Melting Point/Freezing Point	No data available
Boiling Point	59 - 60 °C at 760 mm Hg
Flash Point	-17 °C (1 °F)
Ignition Temperature	No data available
Auto-ignition Temperature	No data available
Lower Explosion Limit	No data available
Upper Explosion Limit	No data available
Vapor Pressure	No data available
Decomposition Temperature	>200 °C
Explosive Properties	Not explosive
Oxidizing Properties	The substance is not classified as oxidizing
Density	1.452 g/mL @ 25 °C (literature)
Water Solubility	Negligible
Partition Coefficient ( <i>n</i> -octanol/water)	No data available
Relative Vapor Density (Air = 1)	8.49
Odor	Ethereal
Odor Threshold	No data available
Evaporation Rate	No data available

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## 9. STABILITY AND REACTIVITY

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<b>Reactivity</b>	Not classified as a reactivity hazard.
<b>Chemical stability</b>	Stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Highly flammable liquid and vapor. Vapors may form explosive mixture with air. Can react with strong oxidizing agents. Hazardous decomposition products will be formed at elevated temperatures.
<b>Conditions to avoid</b>	Heat, flames, and sparks.
<b>Materials to avoid</b>	Oxidizing agents.
<b>Hazardous decomposition products</b>	Hazardous decomposition products formed under fire conditions - carbon oxides, hydrogen fluoride, carbonyl difluoride.

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**10. TOXICOLOGICAL INFORMATION**


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<b>Acute toxicity</b>	
Inhalation	Mice: 1 hour ALC: > 7,178 ppm
Oral	Rats: LD50 > 25,000 mg/kg
<b>Skin corrosion/irritation</b>	Nonirritating. Rabbit – no skin irritation.
<b>Serious eye damage/eye irritation</b>	Not classified based on available information. Rabbit – no eye irritation.
<b>Respiratory or skin sensitization</b>	Not classified based on available information.
<b>Germ cell mutagenicity</b>	Not classified based on available information.
<b>Carcinogenicity</b>	IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.  NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.  OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
<b>Reproductive toxicity</b>	Not classified based on available information.
<b>Specific target organ toxicity (Globally Harmonized System)</b>	
<b>Single exposure</b>	Not classified based on available information.
<b>Repeated exposure</b>	Not classified based on available information. No significant health effects observed in animals at concentrations of 250 ppmV/6h/d or less.
<b>Repeated dose toxicity</b>	Species: rat NOAEL: 2000 ppm LOAEL: 10000 ppm Application route: inhalation (gas) Exposure time: 28 days Method: OECD Test Guidance 412 Remarks: No significant adverse effects were reported.
<b>Aspiration Hazard</b>	Not classified based on available information.

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**11. ECOLOGICAL INFORMATION**


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<b>Toxicity to fish</b>	LC50 (Danio rerio (zebra fish)): > 1,000 mg/l Exposure time: 96 h. Method: OECD Test Guideline 203
<b>Toxicity to daphnia/other aquatic invertebrates</b>	EC50 (Daphnia magna (Water flea)): > 1,000 mg/l Exposure time: 48 h. Method: OECD Test Guideline 202
<b>Toxicity to algae/aquatic plants</b>	ErC50 (Selenastrum capricornutum (green algae)): > 1,000 mg/l. Exposure time: 72 h. Method: OECD Test Guideline 201  NOEC (Selenastrum capricornutum (green algae)): > 1,000 mg/l. Exposure time: 72 h. Method: OECD Test Guideline 201
<b>Bioaccumulative potential</b>	Result: not readily biodegradable.

<b>Mobility in soil</b>	No data available
<b>PBT and vPvB assessment</b>	No data available
<b>Other adverse effects</b>	No data available

**12. DISPOSAL CONSIDERATIONS**

<b>Product</b>	Dispose of in accordance with local regulations. Offer surplus and non-recyclable solutions to a licensed disposal company or contact Fluoryx to return unused product.
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Empty containers retain residue and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury and/or death. If not otherwise specified: Dispose of as unused product.

**13. TRANSPORTATION INFORMATION**

<b>IMDG</b>	UN number: UN 1993 Proper shipping name: Flammable liquid, n.o.s. (3,3,4,4,5,5,6,6,6-Nonafluorohexene) Class: 3 Packing group: II Labels: 3 EmS Code: F-E, <u>S-E</u> Marine pollutant: no
<b>DOT (US 49 CFR)</b>	UN/ID/NA number: UN 1993 Proper shipping name: Flammable liquid, n.o.s. (3,3,4,4,5,5,6,6,6-Nonafluorohexene) Class: 3 Packing group: II Labels: Flammable Liquid ERG Code: 128 Marine pollutant: no
<b>IATA</b>	UN/ID number: UN 1993 Proper shipping name: Flammable liquid, n.o.s. (3,3,4,4,5,5,6,6,6-Nonafluorohexene) Class: Flammable liquids Packing group: II Labels: Flammable Liquids Packing instruction (cargo aircraft): 364 Packing instruction (passenger aircraft): 353

**14. REGULATORY INFORMATION**

**EPCRA - Emergency Planning and Community Right-to-Know**

**CERCLA Reportable Quantity** - This material does not contain any components with a CERCLA RQ.

**SARA 304 Extremely Hazardous Substances Reportable Quantity** - This material does not contain any components with a section 304 EHS RQ.

**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity** - This material does not contain any components with a section 302 EHS TPQ.

**SARA 311/312 Hazards** Flammable (gases, aerosols, liquids, or solids)

**SARA 313**

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**Pennsylvania Right To Know Components**

3,3,4,4,5,5,6,6,6-Nonafluorohexene  
CAS-No. 19430-93-4

**California Prop. 65 Components**

WARNING: This product can expose you to chemicals including pentadecafluorooctanoic acid, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).  
Note to User: This product is not made with PFOA nor is PFOA intentionally present in the product; however, it is possible that PFOA may be present as an impurity at background (environmental) levels.

**15. OTHER INFORMATION****HMIS Classification**

Health Hazard:	0
Flammability:	3
Physical hazards:	0

**NFPA Rating**

Health Hazard:	0
Fire:	3
Reactivity Hazard:	0

**Full text of other abbreviations**

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
OSHA Z-2	USA. Occupational Exposure Limits (OSHA) - Table Z-2
ACGIH / TWA	8-hour, time-weighted average
ACGIH / STEL	Short term exposure limit
ACGIH / C	Ceiling limit
NIOSH REL / TWA	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
NIOSH REL / ST	STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
NIOSH REL / C	Ceiling value not to be exceeded at any time.
OSHA Z-1 / TWA	8 hour time weighted average
OSHA Z-2 / TWA	8 hour time weighted average

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardization; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing



Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organization for Standardization; KECl - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

**Legal Disclaimer:**

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 SDS