

# 1,1,1,3,3-Pentafluorobutane

sc-258871



The Power is Question

## Material Safety Data Sheet

Hazard Alert Code Key:

EXTREME

HIGH

MODERATE

LOW

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME

1,1,1,3,3-Pentafluorobutane

### STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

### NFPA



### SUPPLIER

Santa Cruz Biotechnology, Inc.  
2145 Delaware Avenue  
Santa Cruz, California 95060  
800.457.3801 or 831.457.3800

### EMERGENCY

ChemWatch  
Within the US & Canada: 877-715-9305  
Outside the US & Canada: +800 2436 2255  
(1-800-CHEMCALL) or call +613 9573 3112

### SYNONYMS

C4-H5-F5, pentafluorobutane, "butane, 1, 1, 1, 3, 3-pentafluoro-", HFC-365mfc, HFC365mfc

## Section 2 - HAZARDS IDENTIFICATION

### CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	3		
Toxicity:	2		
Body Contact:	2		
Reactivity:	1		
Chronic:	2		

Min/Nil=0  
Low=1  
Moderate=2  
High=3  
Extreme=4



### CANADIAN WHMIS SYMBOLS



### EMERGENCY OVERVIEW

## RISK

Forms very sensitive explosive metallic compounds.  
Highly flammable.

## POTENTIAL HEALTH EFFECTS

### ACUTE HEALTH EFFECTS

#### SWALLOWED

- Although ingestion is not thought to produce harmful effects, the material may still be damaging to the health of the individual following ingestion, especially where pre-existing organ (e.g. liver, kidney) damage is evident.
  - Ingestion may result in nausea, pain, vomiting.
- Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

#### EYE

- Although the material is not thought to be an irritant, direct contact with the eye may produce transient discomfort characterized by tearing or conjunctival redness (as with windburn).

#### SKIN

- The material is not thought to produce adverse health effects or skin irritation following contact (as classified using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
  - The liquid may produce skin discomfort following prolonged contact.
- Defatting and/or drying of the skin may lead to dermatitis.
- The material may accentuate any pre-existing skin condition.
  - Fluorocarbons remove natural oils from the skin, causing irritation, dryness and sensitivity.

#### INHALED

- The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
  - Inhalation of vapor may aggravate a pre-existing respiratory condition.
  - Inhalation hazard is increased at higher temperatures.
  - Inhalation of vapor may result in nausea, headache.
  - Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction.
  - Exposure to fluorocarbons can produce non-specific flu-like symptoms such as chills, fever, weakness, muscle pain, headache, chest discomfort, sore throat and dry cough with rapid recovery.
- High concentrations can cause irregular heartbeats and a stepwise reduction in lung capacity.

### CHRONIC HEALTH EFFECTS

- Principal routes of exposure are by accidental skin and eye contact and by inhalation of vapours especially at higher temperatures.
- After repeated exposure by inhalation at 5000 ppm, rats showed skeletal effects.
- Mutagenicity studies were negative.
- Fluorocarbons can cause an increased risk of cancer, spontaneous abortion and birth defects.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
(+/-)-bromocyclohexene		>98

## Section 4 - FIRST AID MEASURES

#### SWALLOWED

- If poisoning occurs, contact a doctor or Poisons Information Center. · If swallowed do NOT induce vomiting. · If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. · Observe the patient carefully. · Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. · Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. · Seek medical advice.

#### EYE

- If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

#### SKIN

- If skin contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

#### INHALED

- If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

### NOTES TO PHYSICIAN

- Treat symptomatically.
- DO NOT administer sympathomimetic drugs as they may cause ventricular arrhythmias.

## Section 5 - FIRE FIGHTING MEASURES

Upper Explosive Limit (%):	13.3
Specific Gravity (water=1):	1.27
Lower Explosive Limit (%):	3.8
Relative Vapor Density (air=1):	5.11

### EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.

### FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- May be violently or explosively reactive.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 500 metres in all directions.

### GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Liquid and vapor are flammable.
  - Moderate fire hazard when exposed to heat or flame.
- Other combustion products include: hydrogen fluoride.

### FIRE INCOMPATIBILITY

- Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

### PERSONAL PROTECTION

Glasses:

Safety Glasses.

Gloves:

Respirator:

Type A Filter of sufficient capacity

## Section 6 - ACCIDENTAL RELEASE MEASURES

### MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.

### MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

## Section 7 - HANDLING AND STORAGE

### PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

### RECOMMENDED STORAGE METHODS

- Packing as supplied by manufacturer. Plastic containers may only be used if approved for flammable liquid.

### STORAGE REQUIREMENTS

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

The following materials had no OELs on our records

- 1,1,1,1,3,3,3-pentafluorobutane: CAS:406-58-6

### PERSONAL PROTECTION



### RESPIRATOR

Type A Filter of sufficient capacity  
Consult your EHS staff for recommendations

#### EYE

- Safety glasses.
- Safety glasses with side shields.

#### HANDS/FEET

- Wear chemical protective gloves, eg. PVC.

#### ENGINEERING CONTROLS

- General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### PHYSICAL PROPERTIES

Liquid.  
Does not mix with water.  
Sinks in water.

State	Liquid	Molecular Weight	148.07
Melting Range (°F)	Not available	Boiling Range (°F)	104 (1013 mbar)
Solubility in water (g/L)	Partly miscible	Flash Point (°F)	Not available
pH (1% solution)	6 (1.7 g/l)	Decomposition Temp (°F)	Not available
pH (as supplied)	Not applicable	Autoignition Temp (°F)	1076
Vapor Pressure (mmHg)	324.777 (20 C)	Upper Explosive Limit (%)	13.3
Specific Gravity (water=1)	1.27	Lower Explosive Limit (%)	3.8
Relative Vapor Density (air=1)	5.11	Volatile Component (%vol)	Not available
Evaporation Rate	Not available		

### APPEARANCE

Volatile, colourless liquid with ethereal odour; does not mix well with water (1.7 g/l, 21 C). Viscosity 0.4 mPa.s (25 C).

log Kow 1.6 Potential for bioaccumulation not high (measured value, log Kow).

Material	Value
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## Section 10 - CHEMICAL STABILITY

### CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

### STORAGE INCOMPATIBILITY

- Avoid reaction with oxidizing agents.

Haloalkanes:

- are highly reactive:some of the more lightly substituted lower members are highly flammable; the more highly substituted may be used as fire suppressants, not always with the anticipated results.
- may react with the lighter divalent metals to produce more reactive compounds analogous to Grignard reagents.
- may produce explosive compounds following prolonged contact with metallic or other azides
- may react on contact with potassium or its alloys - although apparently stable on contact with a wide range of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact; severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures .

BREITHERICK L.: Handbook of Reactive Chemical Hazards

- react with metal halides and active metals, eg. sodium (Na), potassium (K), lithium (Li),calcium (Ca), zinc (Zn), powdered aluminium (Al) and aluminium alloys, magnesium (Mg) and magnesium alloys.
- may react with brass and steel.
- may react explosively with strong oxidisers
- may degrade rubber, and plastics such as methacrylate polymers, polyethylene and polystyrene, paint and coatings.

For incompatible materials - refer to Section 7 - Handling and Storage.

## Section 11 - TOXICOLOGICAL INFORMATION

1,1,1,3,3-pentafluorobutane

### TOXICITY AND IRRITATION

1,1,1,3,3-PENTAFLUOROBUTANE:

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
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Oral (rat) LD50: >2000 mg/kg \* Skin (rabbit): non-irritating \*

Eye (rabbit): slight Irritant \*

Non-sensitising on guinea pig skin.\*

\* Solvay MSDS

## Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

## Section 13 - DISPOSAL CONSIDERATIONS

### US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

### Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

- Consult manufacturer for recycling options and recycle where possible .
- Consult Waste Management Authority for disposal.

## Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols: None Hazard class or Division: 3

Identification Numbers: UN1993 PG: II

Label Codes: 3 Special provisions: IB2, T7,

TP1, TP8,

TP28

Packaging: Exceptions: 150 Packaging: Non- bulk: 202

Packaging: Exceptions: 150 Quantity limitations: 5 L

Passenger aircraft/rail:

Quantity Limitations: Cargo 60 L Vessel stowage: Location: B

aircraft only:

Vessel stowage: Other: None

Hazardous materials descriptions and proper shipping names:

Flammable liquids, n.o.s.

### Air Transport IATA:

ICAO/IATA Class: 3 ICAO/IATA Subrisk: None

UN/ID Number: 1993 Packing Group: II

Special provisions: A3

Cargo Only

Packing Instructions: 60 L Maximum Qty/Pack: 5 L

Passenger and Cargo Passenger and Cargo

Packing Instructions: 307 Maximum Qty/Pack: 305

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 1 L Maximum Qty/Pack: Y305

Shipping Name: FLAMMABLE LIQUID, N.O.S. \*(CONTAINS 1,1,1,3,  
3-PENTAFLUOROBUTANE)

### Maritime Transport IMDG:

IMDG Class: 3 IMDG Subrisk: None

UN Number: 1993 Packing Group: II

EMS Number: F-E , S-E Special provisions: 274

Limited Quantities: 1 L

Shipping Name: FLAMMABLE LIQUID, N.O.S.

## Section 15 - REGULATORY INFORMATION

**1,1,1,3,3-pentafluorobutane (CAS: 406-58-6) is found on the following regulatory lists;**

"Canada Domestic Substances List (DSL)", "US Toxic Substances Control Act (TSCA) - Inventory"

## Section 16 - OTHER INFORMATION

*Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.*

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:  
[www.chemwatch.net/references](http://www.chemwatch.net/references).

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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