



# Right to Know Hazardous Substance Fact Sheet

Common Name: **1,1-DIFLUOROETHANE**

Synonyms: Ethylidene Fluoride; Freon 152A; Genetron 100

Chemical Name: Ethane, 1,1-Difluoro-

Date: March 1999      Revision: March 2008

CAS Number: 75-37-6

RTK Substance Number: 0715

DOT Number: UN 1030

## Description and Use

**1,1-Difluoroethane** is a colorless and odorless gas which is used as a liquefied compressed gas. It is used as a cooling agent, as an aerosol propellant, and in the manufacture of other chemicals.

## Reasons for Citation

- ▶ **1,1-Difluoroethane** is on the Right to Know Hazardous Substance List because it is cited by DOT, DEP, IRIS and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

[SEE GLOSSARY ON PAGE 5.](#)

## FIRST AID

### Eye Contact

- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing. Seek medical attention.

### Skin Contact

- ▶ Immerse affected part in warm water. Seek medical attention.

### Inhalation

- ▶ Remove the person from exposure.
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.
- ▶ Medical observation is recommended for 24 to 48 hours after overexposure, as pulmonary edema may be delayed.

## EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

**EMERGENCY RESPONDERS >>>> SEE BACK PAGE**

## Hazard Summary

Hazard Rating	NJDOH	NFPA
<b>HEALTH</b>	1	-
<b>FLAMMABILITY</b>	4	-
<b>REACTIVITY</b>	0	-
FLAMMABLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

*Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe*

- ▶ **1,1-Difluoroethane** can affect you when inhaled.
- ▶ Contact can irritate the skin and eyes.
- ▶ Contact with the *liquid* can cause frostbite.
- ▶ Inhaling **1,1-Difluoroethane** can irritate the nose and throat causing coughing and wheezing.
- ▶ Inhaling **1,1-Difluoroethane** can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
- ▶ High exposure can decrease the amount of *Oxygen* in the air. This can cause headache, dizziness, lightheadedness and passing out.
- ▶ Prolonged or repeated exposure can cause drying and cracking of the skin.
- ▶ **1,1-Difluoroethane** may affect the heart.
- ▶ **1,1-Difluoroethane** is a FLAMMABLE GAS and a DANGEROUS FIRE HAZARD.

## Workplace Exposure Limits

No occupational exposure limits have been established for **1,1-Difluoroethane**. However, it may pose a health risk. Always follow safe work practices.

## Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health Hazardous Substance Fact Sheet, available on the RTK website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## Health Hazard Information

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **1,1-Difluoroethane**:

- ▶ Contact can irritate the skin and eyes.
- ▶ Contact with the *liquid* can cause frostbite.
- ▶ Inhaling **1,1-Difluoroethane** can irritate the nose and throat causing coughing and wheezing.
- ▶ Inhaling **1,1-Difluoroethane** can irritate the lungs causing coughing and/or shortness of breath. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- ▶ High exposure can decrease the amount of *Oxygen* in the air. This can cause headache, dizziness, lightheadedness, and passing out.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **1,1-Difluoroethane** and can last for months or years:

### Cancer Hazard

- ▶ According to the information presently available to the New Jersey Department of Health, **1,1-Difluoroethane** has not been tested for its ability to cause cancer in animals.

### Reproductive Hazard

- ▶ There is no evidence that **1,1-Difluoroethane** affects reproduction. This is based on test results presently available to the NJDOH from published studies.

### Other Effects

- ▶ Prolonged or repeated exposure can cause drying and cracking of the skin.
- ▶ **1,1-Difluoroethane** may affect the heart causing irregular rhythms.

## Medical

### Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Consider chest x-ray after acute overexposure
- ▶ Special 24-48 hour EKG (Holter monitor) to observe and record abnormal heart rhythms

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

### Mixed Exposures

- ▶ Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

## Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA *Compressed Gases* Standard (29 CFR 1910.101).
- ▶ Before entering a confined space where **1,1-Difluoroethane** is present, check to make sure sufficient *Oxygen* (19.5%) exists.
- ▶ Before entering a confined space where **1,1-Difluoroethane** may be present, check to make sure that an explosive concentration does not exist.

## Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Gloves and Clothing

- ▶ Avoid skin contact with **1,1-Difluoroethane**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.

- ▶ Safety equipment manufacturers recommend *insulated Neoprene* or *Rubber* for gloves and DuPont *Tychem® CSM*, *Responder®*, and *TK*; Kappler *Zytron® 400*; and Saint-Gobain *ONESuit® TEC*, or the equivalent, as protective materials for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- ▶ Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
- ▶ Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- ▶ Do not wear contact lenses when working with this substance.

### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential for overexposure exists, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

## Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **1,1-Difluoroethane** is a FLAMMABLE GAS.
- ▶ Stop flow and use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.
- ▶ If flow cannot be stopped, let fire burn.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Fluoride* and *Carbonyl Fluoride*.
- ▶ CONTAINERS MAY EXPLODE IN FIRE.
- ▶ Use water spray to keep fire-exposed containers cool.
- ▶ Vapors may travel to a source of ignition and flash back.
- ▶ Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source.

## Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **1,1-Difluoroethane** is leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Ventilate area of leak to disperse the gas.
- ▶ Stop flow of gas. If source of leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair leak or allow cylinder to empty.
- ▶ Keep **1,1-Difluoroethane** out of confined spaces, such as sewers, because of the possibility of an explosion.
- ▶ Use water spray to keep cylinders or tanks cool.
- ▶ It may be necessary to contain and dispose of **1,1-Difluoroethane** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

## Handling and Storage

Prior to working with **1,1-Difluoroethane** you should be trained on its proper handling and storage.

- ▶ **1,1-Difluoroethane** may react violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE), and forms explosive compounds with BARIUM; SODIUM; POTASSIUM; and other *divalent light* METALS and METALLIC AZIDES.
- ▶ **1,1-Difluoroethane** is not compatible with *powdered* ALUMINUM and MAGNESIUM, and their ALLOYS; LIQUID OXYGEN; BRASS; and STEEL.
- ▶ Store in tightly closed containers in a cool, well-ventilated area at temperatures below 125°F (52°C).
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **1,1-Difluoroethane** is used, handled, or stored.
- ▶ Use only non-sparking tools and equipment, especially when opening and closing containers of **1,1-Difluoroethane**.

## Occupational Health Information Resources

The New Jersey Department of Health offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

### For more information, please contact:

New Jersey Department of Health  
Right to Know  
PO Box 368  
Trenton, NJ 08625-0368  
Phone: 609-984-2202  
Fax: 609-984-7407  
E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
Web address: <http://www.nj.gov/health/eoh/rtkweb>

***The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.***

## GLOSSARY

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Acute Exposure Guideline Levels (AEGs)** are established by the EPA. They describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Emergency Response Planning Guideline (ERPG)** values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization Potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

**LEL or Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeated** is the movement of chemicals through protective materials.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Common Name: **1,1-DIFLUOROETHANE**

Synonyms: Ethylidene Fluoride; Freon 152A; Genetron 100

CAS No: 75-37-6

Molecular Formula: C<sub>2</sub>H<sub>4</sub>F<sub>2</sub>

RTK Substance No: 0715

Description: Colorless and odorless gas used as a liquefied compressed gas

**HAZARD DATA**

Hazard Rating	Firefighting	Reactivity
<p><b>1 - Health</b></p> <p><b>4 - Fire</b></p> <p><b>0 - Reactivity</b></p> <p><b>DOT#:</b> UN 1030</p> <p><b>ERG Guide #:</b> 115</p> <p><b>Hazard Class:</b> 2.1 (Flammable gas)</p>	<p>FLAMMABLE GAS.</p> <p>Stop flow and use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.</p> <p>If flow cannot be stopped, let fire burn.</p> <p>POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Hydrogen Fluoride</i> and <i>Carbonyl Fluoride</i>.</p> <p>CONTAINERS MAY EXPLODE IN FIRE.</p> <p>Use water spray to keep fire-exposed containers cool.</p> <p>Vapors may travel to a source of ignition and flash back.</p> <p>Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source.</p>	<p><b>1,1-Difluoroethane</b> may react violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE), and forms explosive compounds with BARIUM; SODIUM; POTASSIUM; and other <i>divalent light METALS</i> and METALLIC AZIDES.</p> <p><b>1,1-Difluoroethane</b> is not compatible with powdered ALUMINUM and MAGNESIUM, and their ALLOYS; LIQUID OXYGEN; BRASS; and STEEL.</p>

**SPILL/LEAKS**

**Isolation Distance:**

Small Spill: 100 meters (300 feet)

Large Spill: 800 meters (1/2 mile)

Fire: 1,600 meters (1 mile)

Stop flow of gas.

Keep **1,1-Difluoroethane** out of confined spaces, such as sewers, because of the possibility of an explosion.

May be toxic to aquatic life. Considered to be an *Ozone* depleting substance.

**PHYSICAL PROPERTIES**

**Odor Threshold:** Odorless

**LEL:** 3.7%

**UEL:** 18%

**Vapor Density:** 2.4 (air = 1)

**Vapor Pressure:** 4,437 mm Hg at 77°F (25°C)

**Specific Gravity:** 0.95 (water = 1)

**Water Solubility:** Very slightly soluble

**Boiling Point:** -16.6°F (-27°C)

**Melting Point:** -179°F (-117°C)

**Molecular Weight:** 66.1

**EXPOSURE LIMITS**

No occupational exposure limits have been established for **1,1-Difluoroethane**.

**PROTECTIVE EQUIPMENT**

**Gloves:** Insulated Neoprene or Rubber

**Coveralls:** DuPont Tychem® CSM, Responder®, and TK; Kappler Zytron® 400; and Saint-Gobain ONESuit® TEC

**Respirator:** Supplied air

**HEALTH EFFECTS**

**Eyes:** Irritation. Contact with liquid can cause frostbite.

**Skin:** Irritation, drying and cracking of the skin

Contact with liquid can cause frostbite

**Inhalation:** Nose, throat and lung irritation with coughing, wheezing and/or shortness of breath

Headache, dizziness, lightheadedness and passing out

**FIRST AID AND DECONTAMINATION**

**Remove** the person from exposure.

**Flush** eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn. Seek medical attention.

**Immerse** affected part in warm water. Seek medical attention.

**Transfer** to a medical facility.

**Medical** observation is recommended as symptoms may be delayed.