

Emergency Telephone Numbers:

 (815) 424-2000 CHANNAHON PLANT
 (800) 424-9300 CHEMTREC

Product Name: 134a (1,1,1,2 Tetrafluoroethane)

Revision Date: 01-Jul-2019

SECTION I PRODUCT IDENTIFICATION / COMPANY INFORMATION

Cas Registry #: 811-97-2
Chemical Family: Hydrofluorocarbon
Chemical Name: 1,1,1,2 Tetrafluoroethane
Chemical Formula: CF₃CH₂F

SECTION II COMPOSITION / DATA ON COMPONENTS
GHS Classification: Gases Under Pressure – Liquefied Gas, H280

**GHS Label Elements
 Symbol(s):**

Signal Words: Warning

GHS Hazard Statements:
Physical Hazards

 H280: Contains gas under pressure; may explode if heated.
Gas may reduce oxygen in confined spaces.
Health Hazards
Environmental Hazards
Other Hazards

Rapid evaporation of the liquid may cause frostbite. Vapors are heavier than air and can cause suffocation by reducing available oxygen. May cause cardiac arrhythmia. Misuse or intentional inhalation can be fatal as a result of effects on the heart, without alarming symptoms. Contains the following fluorinated greenhouse gas recorded in the Kyoto Protocol (chemical name): 1,1,1,2-tetrafluoroethane. An environmental hazard cannot be ruled out in case of improper handling or disposal.

GHS Precautionary Statements
Prevention:
Response:
Storage: P410+P403: Protect from sunlight. Store in a well-ventilated place.

SECTION III COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENT	CAS No.	EINICS No.	TARGET (WT%)
1,1,1,2 Tetrafluoroethane	811-97-2	212-377-0	100

SECTION IV FIRST AID MEASURES
Emergency First Aid Procedures
Eye Contact: For liquid contact, irrigate with running water for minimum of 15 minutes. Seek medical attention.

Skin Contact: For liquid contact, warm areas gradually and get medical attention if there is evidence of frost bite or tissue damage. Flush area with lukewarm water. Do not rub affected area. If blistering occurs, apply a sterile dressing. Seek medical attention.

Inhalation: Remove to fresh air. Artificial respiration and/or oxygen may be necessary. Consult a physician.

Ingestion: This material is a gas under normal atmospheric conditions and ingestion is unlikely.

Most important symptoms and effects

Acute: Anesthetic effects at high concentrations.

Delayed: None known or anticipated. See Section 11 for information on effects from chronic exposure, if any.

Notes to Physician: Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

SECTION V FIRE FIGHTING MEASURES

Suitable Extinguishing Media:

This material is not flammable. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Fire Fighting Procedures:

Self-contained breathing apparatus (SCBA) is required if containers rupture and contents are released under fire conditions. Cool containers / tanks with water spray.

Unusual Fire and Explosion Hazards:

If container is not properly cooled, it can rupture in the heat of a fire. Drains can be plugged and valves made inoperable by the formation of ice if rapid evaporation of large quantities of the liquefied gas occurs.

Hazardous Combustion Products: Hazardous decomposition products may include: Hydrogen Fluoride, Carbonyl fluoride. Carbon Oxides.

NPCA - HMIS RATINGS

HEALTH	1
FLAMMABILITY	0
REACTIVITY	1
PERSONAL PROTECTION	-

(Personal Protection Information To Be Supplied By The User)

SECTION VI ACCIDENTAL RELEASE MEASURES

Steps To Be Taken If Material Is Released or Spilled

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with cleanup. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Personal Precautions: Evacuate personnel, thoroughly ventilate area, use self-contained breathing apparatus. Keep upwind of leak - evacuate until gas has dispersed.

Environmental Precautions: Stop spill/release if it can be done safely. Water spray may be useful in minimizing or dispersing vapors. If spill occurs on water notify appropriate authorities and advise shipping of any hazard.

Methods for Containment and Clean-Up: Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect. Notify relevant authorities in accordance with all applicable regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

SECTION VII HANDLING AND STORAGE

Precautions for safe handling: Comply with state and local regulations. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Wash hands thoroughly after handling. Wash clothing after use. Decomposition will occur when product comes in contact with open flame or electrical heating elements. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Contents are under pressure. Gases can accumulate in confined spaces and limit oxygen available for breathing. Use only with adequate ventilation. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well ventilated areas away from heat, direct sunlight. Store only in approved containers. Protect container(s) against physical damage. "Empty" containers retain residue and may be dangerous.

SECTION VIII EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits

Component	ACIGH TLV (TWA)	ACIGH TLV (STEL)	OSHA PEL (TWA)	OTHER PEL
1,1,1,2 Tetrafluoroethane				1000 ppm Dupont AEL

Engineering Controls: Use only with adequate ventilation. Keep container tightly closed.

Personal Protection:

Eye/Face Protection: The use of eye protection (such as splash goggles) that meets or exceeds ANSI Z.87.1 is recommended when there is potential liquid contact to the eye. Depending on conditions of use, a face shield may be necessary.

Skin Protection: Impervious, insulated gloves recommended.

Respiratory Protection: Wear NIOSH approved respiratory protection as appropriate.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION IX PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor:	Clear, colorless liquefied gas with a slight ethereal odor.
Odor Threshold:	No Data
pH:	Not Applicable
Melting / Freezing Point:	No Data
Flash Point (Method):	None per ASTM E681
Lower Explosion Limit:	NA
Vapor Pressure @ 70 °F:	70 PSIG
Specific Gravity (H2O = 1.00):	1.24
Percent Volatile by Volume:	100%
Decomposition Data:	No Data
Initial Boiling Point / Range:	-15.0 °F
Evaporation Rate:	> 1 (Ethyl Ether = 1.0)
Upper Explosion Limit:	NA
Vapor Density (air = 1.00):	3.5
Solubility in Water @ 70 °F:	0.95%
Auto-ignition temperature:	No Data
Viscosity:	No Data

SECTION X STABILITY AND REACTIVITY

Stability:	Stable at normal temperatures and conditions
Hazardous Polymerization:	Can not occur
Incompatibility (Materials to Avoid):	Alkali or Alkaline Earth Metals. Powdered Metal. Powdered Metal Salts.
Hazardous Decomposition Products:	Carbon oxides, Hydrogen fluoride, Carbonyl fluoride, Fluorocarbons.
Conditions to Avoid:	The product is not flammable in air under ambient conditions of temperature and pressure. When pressurized with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions. To avoid thermal decomposition, do not overheat.

SECTION XI TOXICOLOGICAL INFORMATION

Effects Of Over Exposure

- Ingestion:** Aspiration hazard!
- Inhalation:** Inhalation of vapor may produce anesthetic effects and feeling of euphoria. Prolonged overexposure can cause rapid breathing, headache, dizziness, narcosis, unconsciousness, and death from asphyxiation, depending on concentration and time of exposure.
- Skin Contact:** Contact with evaporating liquid can cause frostbite.
- Eye Contact:** Liquid can cause severe irritation, redness, tearing, blurred vision, and possible freeze burns.

- Specific Target Organ Toxicity (Single Exposure):** Not expected to cause organ effects from single exposure.
- Specific Target Organ Toxicity (Repeated Exposure):** Not expected to cause organ effects from repeated exposure.
- Carcinogenicity:** Not expected to cause cancer. This substance is not listed as a carcinogen by IARC, NTP or OSHA.
- Germ Cell Mutagenicity:** Not expected to cause heritable genetic effects.
- Reproductive Toxicity:** Not expected to cause reproductive toxicity.

Other Comments: High concentrations may reduce the amount of oxygen available for breathing, especially in confined spaces. Hypoxia (inadequate oxygen) during pregnancy may have adverse effects on the developing fetus.

Information on Toxicological Effects of Components

1,1,1,2 Tetrafluoroethane

Further information :

- Cardiac sensitisation threshold limit : 312975 mg/m3
- Anaesthetic effects threshold limit : 834600 mg/m3
- Did not show carcinogenic or teratogenic effects in animal experiments. Inhalation of decomposition products in high concentration may cause shortness of breath (lung oedema). Rapid evaporation of the liquid may cause frostbite.

Dermal : not applicable
 Oral : not applicable
 Inhalation 4 h LC50 : 567000 ppm , rat

Inhalation Low Observed:
 Adverse Effect : 75000 ppm , dog
 Cardiac sensitization

Concentration (LOAEC)
 Skin irritation : slight irritation, rabbit

Not expected to cause skin irritation based on expert review of the properties of the substance.

No skin irritation, human

Eye irritation : slight irritation, rabbit

	Not expected to cause eye irritation based on expert review of the properties of the substance.
	No eye irritation, human
Skin sensitization :	Did not cause sensitization on laboratory animals., guinea pig Not expected to cause sensitization based on expert review of the properties of the substance.
	Did not cause sensitization on laboratory animals. There are no reports of human respiratory sensitization.
Repeated dose toxicity :	Inhalation rat
	No toxicologically significant effects were found.
Carcinogenicity :	Overall weight of evidence indicates that the substance is not carcinogenic. An increased incidence of benign tumours was observed in laboratory animals.
Mutagenicity :	Did not cause genetic damage in animals. Did not cause genetic damage in cultured mammalian cells. Did not cause genetic damage in cultured bacterial cells.
Reproductive toxicity :	Animal testing showed no reproductive toxicity.
Teratogenicity :	Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.

SECTION XII ECOLOGICAL INFORMATION

Toxicity:

Aquatic Toxicity

1,1,1,2-Tetrafluoroethane

96 h LC50: Oncorhynchus mykiss (rainbow trout) 450 mg/l

72 h EC50 : Algae > 118 mg/l
Information given is based on data obtained from similar substances.

48 h EC50: Daphnia magna (Water flea) 980 mg/l

Environmental Fate

If released to the environment, 1,1,1,2-tetrafluoroethane it will rapidly volatilize to the atmosphere.

Persistence and Degradability: If released to the atmosphere, 1,1,1,2-tetrafluoroethane will undergo a slow gas-phase reaction with photochemically produced hydroxyl radicals. The estimated atmospheric half-life is 1878 days using an average atmospheric hydroxyl radical concn of 5×10^5 molec/cu cm . The atmospheric lifetime of 1,1,1,2-tetrafluoroethane, calculated using both 1 and 2 dimensional models, ranges from 12.5 to 24 yrs. The estimated water solubility of 1,1,1,2-tetrafluoroethane, 67 mg/L at 25 deg C(3-5), indicates that it may undergo atmospheric removal by wet deposition processes; however, any removed is expected to rapidly re-volatilize to the atmosphere.

Bioaccumulative Potential: Not expected as having the potential to bioaccumulate.

Mobility in Soil: Due to the extreme volatility of liquefied gases, air is the only environmental compartment in which they will be found.

Other Adverse Effects: None anticipated.

1,1,1,2-Tetrafluoroethane: GWP: 1300

SECTION XIII DISPOSAL INFORMATION

Waste Disposal

Reclaim by distillation, incinerate, or remove to a permitted waste facility.

Environmental Hazards

Empty pressure vessels should be returned to the supplier.

*** Comply With All State and Local Regulations ***

SECTION XIV TRANSPORT INFORMATION

Transport Information

UN3159, 1,1,1,2 Tetrafluoroethane, 2.2

SECTION XV REGULATIONS

Regulatory Information

Chemical Inventories

USA TSCA: All components of this product are listed on the TSCA Inventory.

Europe Einecs: All components in this product are listed on EINECS

SARA Title III:

CERCLA/SARA (Section 302) Extremely Hazardous Substances and TPQs (in pounds):

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

SARA (311, 312) Hazard Class:

Acute Health: Yes
Chronic Health: No
Fire Hazard: No
Pressure Hazard: Yes

SARA (313) Chemicals: Not listed

California Proposition 65: This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

SECTION XVI OTHER INFORMATION

Watch for leaks and spills. Keep containers sealed and store in cool, well-ventilated area. Provide means to control leaks and spills. Do not mix with finely divided alkali or alkaline earth metals. Comply with all state and local regulations.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for the safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.