Emergency Telephone Numbers: (815) 424-2000 CHANNAHON PLANT
(800) 424-9300 CHEMTREC

Product Name: **152a (1,1 Difluoroethane)** *Revision Date: 01-Jul-2019*

SECTION I PRODUCT IDENTIFICATION / COMPANY INFORMATION

Cas Registry #: 75-37-6
Chemical Family: Hydrofluorocarbon
Chemical Name: 1,1 Difluoroethane
Chemical Formula: CH_3CHF_2

SECTION II COMPOSITION / DATA ON COMPONENTS

GHS Classification: Flammable Gases, 1, H220
Gases Under Pressure – Liquefied Gas, H280

GHS Label Elements Symbol(s):

Signal Words: Danger

GHS Hazard Statements:

Physical Hazards
H220: Extremely flammable gas.
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.

GHS Precautionary Statements

Prevention: P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response: P377: Leaking gas Fire: Do not extinguish, unless leak can be stopped safely.
P381: Eliminate all ignition sources if safe to do so.

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 Difluoroethane	75-37-6	200-866-1	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:
Water spray, Water mist, Foam, Dry chemical or Carbon Dioxide. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Fire Fighting Procedures:
For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. If this cannot be done, allow fire to burn. Move undamaged containers from immediate hazard area if it can be done safely. Stay away from ends of container. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely.

Unusual Fire and Explosion Hazards:
Extremely flammable. Contents under pressure. This material can be ignited by heat, sparks, flames, or other sources of ignition. The vapor is heavier than air. Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. 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. Do not allow run-off from fire fighting to enter drains or water courses – may cause explosion hazard in drains and may reignite.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, hydrogen fluoride, fluorinated compounds, and other products of incomplete combustion. Oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits.

NPCA - HMIS RATINGS

HEALTH	1
FLAMMABILITY	4
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

Avoid sources of ignition - ventilate area. Use water fog to evaporate or ventilate. Protect body against contact with liquid. If confined space - use self contained breathing apparatus. Consult local fire authorities.

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Beware of accumulation of gas in low areas or contained areas, where explosive concentrations may occur. Prevent from entering drains or any place where accumulation may occur. Ventilate area and allow to evaporate. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons downwind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

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: 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. Keep away from heat or sources of ignition. Prohibit smoking in areas of storage or use. Take precautionary measures against static discharge. 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. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. 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, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may 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 or death. Avoid exposing any part of a compressed-gas cylinder to temperatures above 125F (51.6C). Gas cylinders should be stored outdoors or in well ventilated storerooms at no lower than ground level and should be quickly removable in an emergency.

SECTION VIII EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits

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

Engineering Controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

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: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).
A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

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	**Initial Boiling Point / Range:**	-13 °F
Flash Point (Method) :	-58 °F (Estimated)	**Evaporation Rate:**	> 1 (Ethyl Ether = 1.0)
Lower Explosion Limit:	3.9% (vol.) Gas in air	**Upper Explosion Limit:**	16.9% (vol.) Gas in air
Vapor Pressure @ 70 °F:	62.5 PSIG	**Vapor Density (air = 1.00):**	2.4
Specific Gravity (H2O = 1.00) :	0.909	**Solubility in Water @ 70 °F:**	0.28%
Percent Volatile by Volume :	100%	**Auto-ignition temperature:**	849 °F
Decomposition Data:	No Data	**Viscosity**:	No Data

SECTION X STABILITY AND REACTIVITY

Stability:	Stable
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:	High heat, spark, and open flames

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 Difluoroethane

Inhalation: No observed adverse effects were noted in rats exposed to concentrations of 152a of 24994 ppm.
Carcinogenicity: Animal testing did not show any carcinogenic effects.
Reproductive toxicity: Did not show mutagenic or teratogenic effects in animal experiments.

SECTION XII ECOLOGICAL INFORMATION

Toxicity:

152a has low acute inhalation toxicity, with a 4-hour rat approximate lethal concentration (ALC) of 383,000ppm. No valid acute oral toxicity studies are available. Although no standard test results are available, the repeat dose studies show some potential for irritation.

As with most HFCs, 152a has the potential to produce cardiac sensitization in dogs challenged simultaneously with high exposure concentrations and high doses of exogenous epinephrine. Marked responses, which included a cardiac arrhythmia were observed in 3 of 12 dogs at 150,000 ppm. No response was observed at 50,000 ppm. No sensitization studies were available.

HFC-152a has low repeated dose toxicity. HFC-152a had anesthetic properties at a 100,000 ppm exposure level during a 2-week repeated dose inhalation study in rats. No other clinical, haematological, blood chemistry or histopathology effects were observed during the 2-week inhalation study. No adverse effects were observed in rats following a 3-month inhalation exposure to 25,000 ppm 152a.

152a was not mutagenic in the *in vitro* bacterial reverse mutation test (Ames test) in *Salmonella typhimurium* and *Escherichia coli* strains.

In a 2-year bioassay, 152a was not carcinogenic to rats at inhalation exposure levels up to 25,000 ppm. In a developmental study, female rats were exposed via inhalation up to 50,000 ppm during days 6 to 15 of pregnancy for 6 hours per day. No compound related maternal and developmental effects were observed at any of the concentrations tested, hence, the NOEL is 50,000 ppm. No histopathological or weight effects on reproductive organs were observed in male and female rats exposed up to 25,000 ppm HFC-152a for 6 hours per day, 5 days per week for 3, 12 or 24 months.

Toxicity to fish
1,1 Difluoroethane: LC50 / 96 h / Fish (unspecified species): 295,783 mg/l

Toxicity to aquatic invertebrates
1,1 Difluoroethane: EC50 / 48 h / Daphnia: 146,695 mg/l

Persistence and Degradability: On the basis of its physical properties 152a may be expected, when released to the environment, to partition almost exclusively into the atmosphere as it is a gas, with a vapor pressure at 25°C of 6065.2 hPa, and it has a water solubility of 2.671 g/l at 25°C. Any 152a, which might be present in aqueous waste streams discharged directly into rivers or lakes would be expected, by analogy with similar compounds, to have a halflife with respect to volatilization of days or at the very most a few weeks. 152a is expected to exist solely in the vapor-phase in the ambient atmosphere.

Vapor-phase 152a is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals with a lifetime of 1.4 years. The atmospheric lifetime of this chemical suggests that it will mix throughout the troposphere with a globally averaged concentration in 2003 of about 2.6 ppt. Because of its IR absorption, it will contribute a very small amount to climate change with a global warming potential (GWP) relative to CO2 of <140 for a time horizon of 100 years.

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.

1,1 Difluoroethane: Koc: 4,47

Other Adverse Effects: None anticipated.

1,1 Difluoroethane: GWP: 124

SECTION XIII DISPOSAL INFORMATION

Contain the spill. Eliminate sources of ignition. Use water spray to reduce vapors. For small spills, take up with absorbent material. If confined space - use self contained breathing apparatus. Consult local fire authorities.

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

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

SECTION XIV TRANSPORT INFORMATION

Transport Information

UN1030, 1,1 Difluoroethane, 2.1

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
Canada Domestic Substances List (DSL): This product and/or all of its components are listed on the Canadian DSL.
Australia AICS: All components of this product are listed on AICS.
Korea ECL: All components in this product are listed on the Korean Existing Chemicals Inventory (KECI).
Japan Miti (ENCS): All components of this product are listed on MITI.

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:	Yes
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.

EC Classification:


F+ Extremely flammable

Risk phrases:
12 Extremely flammable.

Safety phrases:
9 Keep container in a well-ventilated place.
16 Keep away from sources of ignition -No smoking.
33 Take precautionary measures against static discharges.

SECTION XVI OTHER INFORMATION

Watch for leaks and spills. Keep containers sealed and store in cool, well-ventilated area. Bond and ground containers during liquid transfer. Provide means to control leaks and spills. Protect from sources of ignition. Prohibit smoking in areas of storage or use. 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.