



The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

DuPont
Material Safety Data Sheet

Page 1

"SUVA" 409A
6129FR Revised 2-MAR-2007

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"SUVA" is a registered trademark of DuPont.

Formula : CHCLF2/CHCLFCF3/CH3CCLF2
Molecular Weight : 97.45
CAS Name : FORANE (R) FX-56 GENETRON 409A

Tradenames and Synonyms

HCFC BLEND OF HCFC-22, HCFC-124 & HCFC-142b

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont Fluoroproducts
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS

Product Information : 1-800-441-7515 (outside the U.S.
302-774-1000)
Transport Emergency : CHEMTREC 1-800-424-9300 (outside U.S.
703-527-3887)
Medical Emergency : 1-800-441-3637 (outside the U.S.
302-774-1000)

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
*CHLORODIFLUOROMETHANE (HCFC-22)	75-45-6	60
*1-CHLORO-1,1-DIFLUOROETHANE (HCFC-142b)	75-68-3	15
*ETHANE, 2-CHLORO-1,1,1,2-TETRAFLUORO (HCFC-124)	2837-89-0	25

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Potential Health Effects

INHALATION: Immediate effects of overexposure may cause central nervous system depression with dizziness, confusion, incoordination, drowsiness or unconsciousness. Gross overexposure may cause: Irregular heart beat with a strange sensation in the chest, "heart thumping", apprehension, lightheadedness, feeling of fainting, dizziness, weakness, sometimes progressing to loss of consciousness and death. Other effects include: Suffocation, if air is displaced by vapors or fatality from gross over-exposure. Decomposition products are hazardous.

SKIN CONTACT: Short-term overexposure may cause frostbite, if liquid or escaping vapor contacts the skin. Repeated and/or prolonged exposure may cause: Defatting of the skin with itching, redness or rash.

EYE CONTACT: Contact with the vapor or aerosol may cause eye irritation with tearing, pain, blurred vision or "frostbite-like" effects.

ADDITIONAL HEALTH EFFECTS: Increased susceptibility to the effects of this material may be observed in persons with pre-existing disease of the: central nervous system, cardiovascular system.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION

If inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

(FIRST AID MEASURES - Continued)

INGESTION

Ingestion is not considered a potential route of exposure.

Notes to Physicians

THIS MATERIAL MAY MAKE THE HEART MORE SUSCEPTIBLE TO ARRHYTHMIAS. Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point : No flash point

Flammable Limits in Air, % by Volume:

LEL : None per ASTM E681

UEL : None per ASTM E681

Autoignition: Not determined

Fire and Explosion Hazards:

Cylinders may rupture under fire conditions. Decomposition may occur.

Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and color of torch flames. This flame effect will only occur in concentrations of product well above the recommended exposure limit, therefore stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames.

R-409A is not flammable in air at temperatures up to 100 deg C (212 deg F) at atmospheric pressure. However, mixtures of R-409A with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. R-409A can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing R-409A and air, or R-409A in an oxygen enriched atmosphere becomes combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, R-409A should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example: R-409A should NOT be mixed with air under pressure for leak testing or other purposes.

Experimental data have also been reported which indicate

(FIRE FIGHTING MEASURES - Continued)

combustibility of HCFC-22, a component in this blend, in the presence of chlorine.

Extinguishing Media

Water Spray, Water Fog, CO2, Dry Chemical, Water.

Fire Fighting Instructions

Wear self-contained breathing apparatus (SCBA) and full protective equipment. Cool tank/container with water spray. Keep personnel removed and upwind of fire. Shut off source of fuel, if possible and without risk.

Water runoff should be contained and neutralized prior to release.

Hydrogen fluoride or hydrogen chloride fumes emitted during a fire can react with water to form hydrofluoric acid or hydrochloric acid. Wear neoprene gloves when handling refuse from fire.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

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

Accidental Release Measures

Ventilate area using forced ventilation, especially in low or enclosed places where heavy vapors might collect. Remove open flames. Use self-contained breathing apparatus (SCBA) for large spills or releases.

HANDLING AND STORAGE

Handling (Personnel)

Do not get in eyes, on skin or clothing. Do not breathe vapor or mist. Use with sufficient ventilation to keep employee exposure below recommended limits. Wash contaminated clothing prior to reuse.

Handling (Physical Aspects)

Keep away from heat, sparks and flames. Open container only in well-ventilated area.

(HANDLING AND STORAGE - Continued)

Storage

Keep away from heat, sparks and flames. Store in a well ventilated area away from heat and sunlight.

Close container after each use.

Store below 120 deg F (49 deg C).

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation especially for enclosed and low area where vapors can accumulate.

Personal Protective Equipment

EYE/FACE PROTECTION

Wear coverall chemical splash goggles.

RESPIRATORS

Wear NIOSH approved respiratory protection, as appropriate.

PROTECTIVE CLOTHING

Where there is potential for skin contact have available, and wear as appropriate, impervious gloves, apron, pants, and jacket.

Lined butyl gloves should be used to avoid prolonged or repeated exposure.

Exposure Guidelines

Applicable Exposure Limits

CHLORODIFLUOROMETHANE (HCFC-22)

PEL (OSHA) : None Established
TLV (ACGIH) : 1,000 ppm, 3,540 mg/m³, 8 Hr. TWA, A4
AEL * (DuPont) : None Established

1-CHLORO-1,1-DIFLUOROETHANE

PEL (OSHA) : None Established
TLV (ACGIH) : None Established
AEL * (DuPont) : 1000 ppm, 8 & 12 Hr. TWA
WEEL (AIHA) : 1000 ppm, 8 Hr. TWA

ETHANE, 2-CHLORO-1,1,1,2-TETRAFLUORO

(Applicable Exposure Limits - Continued)

PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established
AEL * (DuPont)	: 1000 ppm, 8 & 12 Hr. TWA
WEEL (AIHA)	: 1000 ppm, 8 Hr. TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point	: -31 F (-35 C)
Vapor Density	: 3.36 (Air=1.0)
Solubility in Water	: Negligible
Specific Gravity	: 1.215 @ 70 F (21 C)
Vapor Pressure	: 107 psia @ 70 F (21 C)
% Volatiles	: 100 %
Odor	: Faint, Ethereal, Ether.
Form	: Liquified Gas.
Color	: Clear, Colorless.

STABILITY AND REACTIVITY

Chemical Stability

Stable.

Conditions contributing to instability: Thermal decomposition due to exposure to heat (>800 deg F) or fire.

Conditions to Avoid

Avoid flames, sparks, extremely hot metal, heating elements, pilot lights, static electricity, combustion engines, ignition sources, etc.

Incompatibility with Other Materials

Avoid contact with strong alkali or alkaline earth metals, finely powdered metals such as aluminum, magnesium or zinc and strong oxidizers since they may react with or accelerate decomposition of this material.

Decomposition

Thermal decomposition products include hydrogen fluoride, hydrogen chloride, carbon monoxide, carbon dioxide and chlorine and possibly carbonyl halides. These materials are toxic and irritating. Contact should be avoided.

TOXICOLOGICAL INFORMATION

Animal Data

CHLORODIFLUOROMETHANE (HCFC-22)

INHALATION: 4 hour, LC50, rat: 220,000 ppm

Animal testing indicates this material is a slight eye and skin irritant, but not a skin sensitizer.

INGESTION: Long-term exposure caused: No significant toxicological effects.

Single exposure to high doses caused: Central nervous system depression. Inactivity or anaesthesia. Lung noise. Altered respiratory rate. Histopathological changes of the liver. Cardiac sensitization, a potentially fatal disturbance of heart rhythm associated with a heightened sensitivity to the action of epinephrine. Repeated exposure caused: No significant toxicological effects. Long-term exposure caused: Reduced weight gain. Increased adrenals, kidney, liver, pituitary weight.

ADDITIONAL TOXICOLOGICAL EFFECTS:

In chronic inhalation studies, HCFC-22, at a concentration of 50,000 ppm (v/v), produced a small, but statistically significant increase of late-occurring tumors involving salivary glands in male rats, but not female rats or male or female mice. In the same studies, no increased incidence of tumors was seen in either species at concentrations of 10,000 ppm or 1000 ppm (v/v). Animal data show developmental effects only at exposure levels producing other toxic effects in the adult animal. This material is not considered a unique developmental hazard to the conceptus. Reproductive data on male animals show: No change in reproductive performance. Specific studies to evaluate the effect on female reproductive performance have not been conducted; however, limited information obtained from studies on developmental toxicity do not indicate adverse effects on female reproductive performance. This material produces genetic damage in bacterial cell cultures. In mammalian cell cultures and animals, this material has not produced genetic toxicity. In animal testing, this material has not caused permanent genetic damage in reproductive cells of mammals (has not produced heritable genetic damage).

1-CHLORO-1,1-DIFLUOROETHANE (HCFC-142b)

Inhalation 2 hour LC50: 447,642 ppm in rats

The compound is untested for skin irritancy, is not an eye irritant, and is untested for animal sensitization.

(TOXICOLOGICAL INFORMATION - Continued)

Inhalation: Toxic effects of single inhalation exposures include respiratory irritation, loss of reflexes, and unconsciousness. Cardiac sensitization was seen in dogs exposed to concentrations of 5% and higher. Exposure of dogs or monkeys to concentrations of 5 to 20% for five minutes caused decreased blood pressure (hypotension). Repeated exposure produced only irritation of the lungs.

Tests in animals demonstrate no carcinogenic, developmental, or reproductive toxicity.

The compound does not produce genetic damage in animals or in bacterial and mammalian cell cultures. It does not produce heritable genetic damage.

ETHANE, 2-CHLORO-1,1,1,2-TETRAFLUORO (HCFC-124)

INHALATION: 4 hour, ALC, rat: 230,000 - 300,000 ppm.

Single exposure caused: Cardiac sensitization, a potentially fatal disturbance of heart rhythm associated with a heightened sensitivity to the action of epinephrine. Lowest-Observed-Adverse-Effect-Level for cardiac sensitization: 25,000 ppm. Single exposure caused: the following temporary effects - Inactivity or anaesthesia. Low blood pressure. Repeated exposure caused: Decreased body weight. Altered clinical chemistry. These effects were reversible. Repeated exposure caused: the following temporary effects - Inactivity or anaesthesia. Lethargy. Incoordination. Altered respiratory rate. One study showed: Increased liver weight.

CARCINOGENIC, DEVELOPMENTAL, REPRODUCTIVE, MUTAGENIC EFFECTS:

In animal testing this material has not caused carcinogenicity, developmental toxicity. No animal data are available to define the following effects of this material: reproductive toxicity. Tests have shown that this material does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. This material has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals (not tested for heritable genetic damage).

ECOLOGICAL INFORMATION

Ecotoxicological Information

AQUATIC TOXICITY:

CHLORODIFLUOROMETHANE (HCFC-22)

48 hour EC50 - Daphnia magna: 433 mg/L

DISPOSAL CONSIDERATIONS

Waste Disposal

Recycle or reclaim if possible. Reclaimed material may be incinerated but toxic and corrosive combustion products (HF and HCL) must be handled appropriately.

Consult Federal, State or local authorities for proper disposal procedures.

TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO/IATA
Proper Shipping Name : LIQUEFIED GAS, N.O.S.
(CHLORODIFLUOROMETHANE,
CHLOROTETRAFLUOROETHANE)
Hazard Class : 2.2
UN No. : UN 3163
DOT/IMO Label : NONFLAMMABLE GAS

OTHER INFORMATION

NFPA, NPCA-HMIS

NPCA-HMIS Rating
Health : 1
Flammability : 0
Reactivity : 1

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : MSDS Coordinator
> : DuPont Fluoroproducts
Address : Wilmington, DE 19898
Telephone : (800) 441-7515

Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS


DuPont™ SUVA® 410A Refrigerant

Version 2.3

Revision Date 17.07.2007

Ref. 130000000570

This SDS adheres to the standards and regulatory requirements of Great Britain and may not meet the regulatory requirements in other countries.

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING
Product information

Product name : DuPont™ SUVA® 410A Refrigerant

Types : ASHRAE Refrigerant number designation: R-410A

Use of the Substance/Preparation : Refrigerant

Company : Du Pont de Nemours (Nederland) B.V.
Baanhoekweg 22
NL-3313 LA Dordrecht
The Netherlands

Telephone : +31-78-630.1011

Emergency telephone : +44-(0)8456-006.640

E-mail address : sds-support@che.dupont.com

2. HAZARDS IDENTIFICATION

Rapid evaporation of the liquid may cause frostbite.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	EC-No.	Classification	Concentration [%]
Pentafluoroethane (R125)	354-33-6	206-557-8		50
Difluoromethane (R32)	75-10-5	200-839-4	F+; R12	50

For the full text of the R phrases mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

General advice : If unconscious place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person. If breathing is irregular or stopped, administer artificial respiration. If symptoms persist, call a physician.

Inhalation : Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary.

Skin contact : Wash off with warm water. Take off all contaminated clothing immediately.

Eye contact : Rinse thoroughly with plenty of water, also under the eyelids. Consult a physician.

**DuPont™ SUVA® 410A Refrigerant**

Version 2.3

Revision Date 17.07.2007

Ref. 130000000570

Notes to physician

Treatment : Do not give adrenaline or similar drugs.

5. FIRE-FIGHTING MEASURES

Specific hazards during fire fighting : pressure build-up

Special protective equipment for fire-fighters : In the event of fire, wear self-contained breathing apparatus.

Further information : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Cool containers / tanks with water spray.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Evacuate personnel to safe areas. Ventilate the area. Refer to protective measures listed in sections 7 and 8.

Environmental precautions : Should not be released into the environment.

Methods for cleaning up : Evaporates.

7. HANDLING AND STORAGE**Handling**

Advice on safe handling : Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.

Advice on protection against fire and explosion : No special protective measures against fire required.

Storage

Requirements for storage areas and containers : Keep container tightly closed in a dry and well-ventilated place. Store in original container.

Advice on common storage : No materials to be especially mentioned.

German storage class : 2A : Compressed, liquefied or pressurised gas

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Engineering measures**

Ensure adequate ventilation, especially in confined areas.

Personal protective equipment

Respiratory protection : For rescue and maintenance work in storage tanks use self-contained breathing

**DuPont™ SUVA® 410A Refrigerant**

Version 2.3

Revision Date 17.07.2007

Ref. 130000000570

apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Hand protection	:	Heat insulating gloves
Eye protection	:	Safety glasses
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	Liquefied gas,
Colour	:	colourless,
Odour	:	ether-like,
pH	:	neutral
Boiling point/boiling range	:	-51,6 °C at 1 013 hPa
Flash point	:	does not flash
Lower explosion limit	:	, not applicable
Vapour pressure	:	16 530 hPa at 25 °C
Vapour pressure	:	30 520 hPa at 50 °C
Density	:	1,062 g/cm ³ at 25 °C, (as liquid)
Density	:	0,0066 g/cm ³ at ca. 26 °C (1 013 hPa)

10. STABILITY AND REACTIVITY

Materials to avoid	:	Alkali metals, Alkaline earth metals, Powdered metals, Powdered metal salts
Hazardous decomposition products	:	Hydrogen halides, Carbon dioxide (CO ₂), Carbon monoxide, Fluorocarbons, Carbonyl halides

11. TOXICOLOGICAL INFORMATION

Acute inhalation toxicity	:	
• Pentafluoroethane (R125)	:	ALC/ 4 h/ rat : > 3 480 mg/l
• Difluoromethane (R32)	:	LC50/ 4 h/ rat : 2 158 mg/l
Carcinogenicity assessment	:	Did not show carcinogenic effects in animal experiments.
Toxicity to reproduction assessment	:	Did not show mutagenic or teratogenic effects in animal experiments.


DuPont™ SUVA® 410A Refrigerant

Version 2.3

Revision Date 17.07.2007

Ref. 130000000570

Human experience : Excessive exposures may affect human health, as follows:

Inhalation
Severe shortness of breath, narcosis, Irregular cardiac activity

Further information : Rapid evaporation of the liquid may cause frostbite.

12. ECOLOGICAL INFORMATION

Global warming potential (GWP) : 1 975

13. DISPOSAL CONSIDERATIONS

Product : Can be used after re-conditioning.

Contaminated packaging : Empty pressure vessels should be returned to the supplier.

14. TRANSPORT INFORMATION
ADR

Class: 2
 Classification Code: 2A
 HI No.: 20
 UN-Number: 1078
 Labelling No.: 2.2
 Proper shipping name: Refrigerant gas, n.o.s. (Pentafluoroethane, Difluoromethane)

IATA_C

Class: 2.2
 UN-Number: 1078
 Labelling No.: 2.2
 Proper shipping name: Refrigerant gas, n.o.s. (Pentafluoroethane, Difluoromethane)

IMDG

Class: 2.2
 UN-Number: 1078
 Labelling No.: 2.2
 Proper shipping name: Refrigerant gas, n.o.s. (Pentafluoroethane, Difluoromethane)

15. REGULATORY INFORMATION
Labelling according to EC Directives

The product does not need to be labelled in accordance with EC directives or respective national laws.

National legislation

Water contaminating class (Germany) : WGK 1 slightly water endangering



DuPont™ SUVA® 410A Refrigerant

Version 2.3

Revision Date 17.07.2007

Ref. 130000000570

16. OTHER INFORMATION

Text of R phrases mentioned in Section 3

R12 Extremely flammable.

Further information

Before use read DuPont's safety information., For further information contact the local DuPont office or DuPont's nominated distributors., ® DuPont's registered trademark

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 a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The above information relates only to the specific material(s) designated herein and may not be valid for such material(s) used in combination with any other materials or in any process or if the material is altered or processed, unless specified in the text.