Material Safety Data Sheet

DuPont™ SUVA® 409A Refrigerant

Version 2.2

Revision Date 09/12/2011 Ref. 130000050843

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

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	DuPont™ SUVA® 409A Refrigerant
Product Grade/Type	:	ASHRAE Refrigerant number designation: R-409A
Tradename/Synonym	:	HCFC-22/HCFC-124/HCFC-142b BLEND
MSDS Number	:	130000050843
Product Use	:	Refrigerant
Manufacturer	:	DuPont 1007 Market Street Wilmington, DE 19898
Product Information	:	1-800-441-7515 (outside the U.S. 1-302-774-1000)
Medical Emergency	:	1-800-441-3637 (outside the U.S. 1-302-774-1139)
Transport Emergency	:	CHEMTREC: 1-800-424-9300 (outside the U.S. 1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Misuse or intentional inhalation abuse may lead to death without warning.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Rapid evaporation of the liquid may cause frostbite.

Potential Health Effects

Skin	:	Contact with liquid or refrigerated gas can cause cold burns and frostbite.
Eyes	:	Contact with liquid or refrigerated gas can cause cold burns and frostbite.

Inhalation : Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.
Other symptoms potentially related to misuse or inhalation abuse are: Anaesthetic effects, Light-headedness, dizziness, confusion, incoordination, drowsiness, or unconsciousness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

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

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Chlorodifluoromethane (HCFC-22)	75-45-6	60 %
1-Chloro-1,2,2,2-tetrafluoroethane (HCFC-124)	2837-89-0	25 %
1-Chloro-1,1-difluoroethane (HCFC-142b)	75-68-3	15 %

SECTION 4. FIRST AID MEASURES

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Take off all contaminated clothing immediately. Consult a physician. Wash contaminated clothing before re-use. Treat for frostbite if necessary by gently warming affected area.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician if necessary.

Inhalation	:	Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
Ingestion	:	Is not considered a potential route of exposure.
General advice	:	Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
Notes to physician	:	Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

SECTION 5. FIREFIGHTING MEASURES

Flammable Properties

Flash point	:	does not flash
Lower explosion limit	:	Method : None per ASTM E681
Upper explosion limit	:	Method : None per ASTM E681
Fire and Explosion Hazard	:	Cylinders are equipped with pressure and temperature relief devices, but may still 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 colour of the torch flame. 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.

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

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Firefighting Instructions : Cool containers / tanks with water spray. Self-contained breathing apparatus (SCBA) is required if containers rupture and contents are released under fire conditions.
Water runoff should be contained and neutralized prior to release.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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, especially low or enclosed places where heavy vapours might collect. Self-contained breathing apparatus (SCBA) is required if a large release occurs. Avoid open flames and high temperatures.

SECTION 7. HANDLING AND STORAGE

Handling (Personnel) : Avoid breathing vapours or mist. Avoid contact with skin and eyes. Use sufficient ventilation to keep employee exposure below recommended limits.

Storage : Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (>3000 psig) piping or systems. Never attempt to lift cylinder by its cap. Keep away from heat. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Cylinders should be stored upright and firmly secured to
prevent falling or being knocked over.
Separate full containers from empty containers. Keep at temperature not exceeding 52°C. Do not store near combustible materials. Avoid area where salt or other corrosive materials are present.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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

Personal protective equipment

Respiratory protection : Under normal manufacturing conditions, no respiratory protection is required when using this product.

Hand protection : Additional protection: Impervious butyl rubber gloves

Eye protection : Wear safety glasses with side shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

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

Exposure Guidelines

Exposure Limit Values

Chlorodifluoromethane

TLV	(ACGIH)	1,000 ppm	TWA

1-Chloro-1,2,2,2-tetrafluoroethane

AEL *	(DUPONT)	1,000 ppm	8 & 12 hr. TWA

1-Chloro-1,1-difluoroethane

AEL *	(DUPONT)	1,000 ppm	8 & 12 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.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	Liquefied gas
Color	:	clear, colourless
Odor	:	slight, ether-like
Boiling point	:	-34.4 °C (-29.9 °F)
% Volatile	:	100 %
Vapour Pressure	:	8,021.1 hPa at 25 °C (77 °F)
Specific gravity	:	1.22 at 25 °C (77 °F)
Water solubility	:	not determined
Vapour density	:	3.4 at 25°C (77°F) and 1013 hPa (Air=1.0)

SECTION 10. STABILITY AND REACTIVITY

Stability	:	Stable at normal temperatures and storage conditions.
Conditions to avoid	:	Avoid open flames and high temperatures.
Incompatibility	:	Alkali metals Alkaline earth metals, Powdered metals, strong oxidizers
Hazardous decomposition products	:	Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids, and possibly carbonyl halides., These materials are toxic and irritating., Avoid contact with decomposition products
Hazardous reactions	:	Polymerization will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

Chlorodifluoromethane (HCFC-22)

Dermal	:	not applicable
Oral	:	not applicable
Inhalation 4 h LC50	:	220000 ppm , rat
Inhalation	:	dog Cardiac sensitization
Skin irritation	:	No skin irritation, rabbit Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	:	No eye irritation, rabbit Not expected to cause eye irritation based on expert review of the properties of the substance.
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.
Repeated dose toxicity	:	Inhalation mouse No toxicologically significant effects were found.
Carcinogenicity	:	An increased incidence of tumours was observed in some laboratory animals but not in others. Overall weight of evidence indicates that the substance is not carcinogenic.
Mutagenicity	:	Did not cause genetic damage in animals. Did not cause genetic damage in cultured mammalian cells. Experiments showed mutagenic effects in cultured bacterial cells.
Reproductive toxicity	:	Evidence suggests the substance is not a reproductive toxin in animals.
Teratogenicity	:	Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.

Further information	:	Cardiac sensitisation threshold limit : 175000 mg/m3

1-Chloro-1,2,2,2-tetrafluoroethane (HCFC-124)

Dermal	:	not applicable
Oral	:	not applicable
Inhalation 4 h LC50	:	> 230000 ppm , rat Anaesthetic effects Central nervous system effects
Inhalation	:	dog Cardiac sensitization
Skin irritation	:	No skin irritation, Not tested on animals Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	:	No eye irritation, Not tested on animals Not expected to cause eye irritation based on expert review of the properties of the substance.
Skin sensitization	:	Does not cause skin sensitization., Not tested on animals Not expected to cause sensitization based on expert review of the properties of the substance. There are no reports of human respiratory sensitization.
Repeated dose toxicity	:	Inhalation multiple species No toxicologically significant effects were found.
Carcinogenicity	:	Animal testing did not show any carcinogenic effects.
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.
Teratogenicity	:	Animal testing showed no developmental toxicity.
Further information	:	Cardiac sensitisation threshold limit : 140000 mg/m3

1-Chloro-1,1-difluoroethane (HCFC-142b)

Inhalation 4 h LC50	:	> 400000 ppm , rat Target Organs: Central nervous system narcosis Lethargy Laboured breathing lung effects Kidney effects
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	:	25000 ppm , dog Cardiac sensitization
Inhalation No Observed Adverse Effect Concentration (NOAEC)	:	25000 ppm , dog Cardiac sensitization
Repeated dose toxicity	:	Inhalation multiple species No toxicologically significant effects were found.
Carcinogenicity	:	Animal testing did not show any carcinogenic effects.
Mutagenicity	:	Overall weight of evidence indicates that the substance is not mutagenic. Animal testing did not show any mutagenic effects. Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others. Genetic damage in cultured bacterial cells was observed in some laboratory tests but not in others.
Teratogenicity	:	Animal testing showed no developmental toxicity.
Further information	:	Cardiac sensitisation threshold limit : 102500 mg/m3

SECTION 12. ECOLOGICAL INFORMATION

Aquatic Toxicity

Chlorodifluoromethane (HCFC-22)

96 h LC50	:	Zebra fish 777 mg/l

96 h EC50	:	Algae 250 mg/l
48 h EC50	:	Daphnia magna (Water flea) 433 mg/l

1-Chloro-1,1-difluoroethane (HCFC-142b)

96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 36 mg/l
48 h EC50	:	Daphnia magna (Water flea) > 190 mg/l

Environmental Fate

Chlorodifluoromethane (HCFC-22)

Biodegradability	:	According to the results of tests of biodegradability this product is not readily biodegradable.

1-Chloro-1,1-difluoroethane (HCFC-142b)

Biodegradability	:	Not readily biodegradable.
Bioaccumulation	:	Bioaccumulation is unlikely.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal	:	Can be used after re-conditioning. Recover by distillation or remove to a permitted waste disposal facility. Comply with applicable Federal, State/Provincial and Local Regulations.
Environmental Hazards	:	Empty pressure vessels should be returned to the supplier.

SECTION 14. TRANSPORT INFORMATION

DOT	UN number	:	3163
	Proper shipping name	:	Liquefied gas, n.o.s. (Chlorodifluoromethane, 2-Chloro-1,1,1,2-Tetrafluoroethane)
	Class	:	2.2
	Labelling No.	:	2.2
IATA_C	UN number	:	3163

	Proper shipping name	:	Liquefied gas, n.o.s. (Chlorodifluoromethane, 2-Chloro-1,1,1,2-Tetrafluoroethane)
	Class	:	2.2
	Labelling No.	:	2.2
IMDG	UN number	:	3163
	Proper shipping name	:	Liquefied gas, n.o.s. (Chlorodifluoromethane, 2-Chloro-1,1,1,2-Tetrafluoroethane)
	Class	:	2.2
	Labelling No.	:	2.2

SECTION 15. REGULATORY INFORMATION

SARA 313 Regulated Chemical(s)	:	1-Chloro-1,2,2,2-tetrafluoroethane , Chlorodifluoromethane , 1-Chloro-1,1-difluoroethane
California Prop. 65	:	Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known
PA Right to Know Regulated Chemical(s)	:	Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for Special Hazardous Substances): Chlorodifluoromethane , 1-Chloro-1,1-difluoroethane
NJ Right to Know Regulated Chemical(s)	:	Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): 1-Chloro-1,2,2,2-tetrafluoroethane , Chlorodifluoromethane , 1-Chloro-1,1-difluoroethane

SECTION 16. OTHER INFORMATION

		HMIS
Health	:	1
Flammability	:	0
Reactivity/Physical hazard	:	1

SUVA is a registered trademark of E. I. du Pont de Nemours and Company
Before use read DuPont's safety information.

DuPont™ SUVA® 409A Refrigerant

Version 2.2

Revision Date 09/12/2011 Ref. 130000050843

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 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.

Significant change from previous version is denoted with a double bar.