

**DuPont™ SUVA® 404A refrigerant**

Version 2.1

Revision Date 11/04/2010

Ref. 130000000494

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® 404A refrigerant
Product Grade/Type : ASHRAE Refrigerant number designation: R-404A

Tradename/Synonym : HP62
404A

MSDS Number : 130000000494

Product Use : Refrigerant

Manufacturer : DuPont
1007 Market Street
Wilmington, DE 19898

Product Information : 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.
May cause skin irritation.
May cause: Discomfort, itching, redness, or swelling.

Eyes : Contact with liquid or refrigerated gas can cause cold burns and frostbite.
May cause eye irritation.
May cause: tearing, Redness, Discomfort.

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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
1,1,1-Trifluoroethane (HFC-143a)	420-46-2	52 %
Pentafluoroethane (HFC-125)	354-33-6	44 %
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	4 %

SECTION 4. FIRST AID MEASURES

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.

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Inhalation	: Remove from exposure, lie down. Artificial respiration and/or oxygen may be necessary. Call 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. FIRE-FIGHTING 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.

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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 : As appropriate for combustibles in area. Extinguishant for other burning material in area is sufficient to stop burning.

Firefighting Instructions : Use water spray or fog to protect the fire fighters and to cool container. 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.

Safeguards (Personnel) : Ventilate area, especially low or enclosed places where heavy vapours might collect.

Accidental Release Measures : Avoid open flames and high temperatures. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

SECTION 7. HANDLING AND STORAGE

Handling (Personnel) : Avoid breathing vapours or mist. Avoid skin or eye contact with liquid. Use


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sufficient ventilation to keep employee exposure below recommended limits. Contact with chlorine or other strong oxidizing agents should also be avoided. Handle in accordance with good industrial hygiene and safety practice.

Storage : Store in a clean, dry place. Do not heat above 52° C (125° F).

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls : Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places. Refrigerant concentration monitors may be necessary to determine vapour concentrations in work areas prior to use of torches or other open flames, or if employees are entering enclosed areas.

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

Hand protection : Material: Impervious gloves

Eye protection : Wear coverall chemical splash goggles.

Protective measures : Self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Guidelines
Exposure Limit Values

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

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

1,1,1,2-Tetrafluoroethane
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.

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SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	: Liquefied gas
Color	: colourless
Odor	: slight, ether-like
Boiling point/boiling range	: -45.5 °C (-49.9 °F)
% Volatile	: 100 %
Vapour Pressure	: 12,546 hPa at 25 °C (77 °F)
Specific Gravity	: 1.05 at 25 °C (77 °F)
Water solubility	: not determined
Evaporation rate	: > 1 (CCL4=1.0)

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	: Material is stable. Avoid open flames and high temperatures.
Incompatibility	: Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts
Hazardous decomposition products	: Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride. These materials are toxic and irritating., Avoid contact with decomposition products
Hazardous reactions	: Polymerization will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

1,1,1-Trifluoroethane (HFC-143a)	
Inhalation 4 h LC50	: 540000 ppm , rat Anaesthetic effects
Inhalation	: dog Cardiac sensitization
Skin irritation	: No skin irritation, Not tested on animals


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		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.
Repeated dose toxicity	:	Inhalation rat 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. 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 : 1020000 mg/m3
Pentafluoroethane (HFC-125)		
Inhalation 4 h LC50	:	800000 ppm , rat
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.

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Repeated dose toxicity	: Inhalation rat No toxicologically significant effects were found.
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 : 490000 mg/m3
1,1,1,2-Tetrafluoroethane (HFC-134a)	
Inhalation 4 h LC50	: > 359300 ppm , rat
Inhalation	: dog Cardiac sensitization
Skin irritation	: slight irritation, rabbit No skin irritation, human
Eye irritation	: slight irritation, rabbit No eye irritation, human
Skin sensitization	: Did not cause sensitization on laboratory animals., guinea pig
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.


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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 : 312975 mg/m3

SECTION 12. ECOLOGICAL INFORMATION
Aquatic Toxicity
1,1,1-Trifluoroethane (HFC-143a)

96 h LC50 : Oncorhynchus mykiss (rainbow trout) > 40 mg/l

48 h EC50 : Daphnia 300 mg/l

1,1,1,2-Tetrafluoroethane (HFC-134a)

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

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

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 : 3337

Proper shipping name : Refrigerant gas R 404A

Class : 2.2

Labelling No. : 2.2

IATA_C UN number : 3337


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	Proper shipping name	: Refrigerant gas R 404A
IMDG	Class	: 2.2
	Labelling No.	: 2.2
	UN number	: 3337
	Proper shipping name	: Refrigerant gas R 404A
	Class	: 2.2
	Labelling No.	: 2.2

SECTION 15. REGULATORY INFORMATION

SARA 313 Regulated Chemical(s) : SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Prop. 65 : Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

SECTION 16. OTHER INFORMATION
HMIS

Health	:	1
Flammability	:	0
Reactivity/Physical hazard	:	1
PPE	:	Personal Protection rating to be supplied by user depending on use conditions.

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Before use read DuPont's safety information.

For further information contact the local DuPont office or DuPont's nominated distributors.

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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



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with any other materials or in any process, unless specified in the text.

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