DuPont™ SUVA® 404A refrigerant

Version 2.3
Revision Date 08.07.2013 Ref. 130000000494

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

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product information

Trade name	:	DuPont™ SUVA® 404A refrigerant
Types	:	ASHRAE Refrigerant number designation: R-404A
Use of the Substance/Mixture	:	Refrigerant
Company	:	Du Pont (Australia) Pty Ltd 7 Eden Park Drive Macquarie Park NSW 2113 Australia
Telephone	:	(02) 9923 6111
Telefax	:	(02) 9923 6011
Emergency telephone number	:	(02) 9923 6275 (Transport Emergency) (24 hr Emergency Medical Information: 1800 674 415)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : HP62
404A

Components

Chemical Name	CAS-No.	Concentration
1,1,1-Trifluoroethane	420-46-2	52 %
Pentafluoroethane	354-33-6	44 %
1,1,1,2-Tetrafluoroethane	811-97-2	4 %

3. HAZARDS IDENTIFICATION

Hazard classification
Classified as dangerous goods according to the ADG Code
Not classified as hazardous according to criteria of NOHSC.

Specific hazards
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.

4. FIRST AID MEASURES

General advice	:	Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
Inhalation	:	Remove from exposure, lie down. Artificial respiration and/or oxygen may be necessary. 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.

Ingestion : Is not considered a potential route of exposure.

Notes to physician

Treatment : Do not give adrenaline or similar drugs.

5. FIREFIGHTING MEASURES

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

Specific hazards during firefighting : Pressure build-up.

Hazardous thermal decomposition products: Carbon oxides Hydrogen fluoride Carbonyl fluoride Fluorocarbons Exposure to decomposition products may be a hazard to health.

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire.

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

Cool containers / tanks with water spray.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect. Refer to protective measures listed in sections 7 and 8.

Environmental precautions : Should not be released into the environment.

Methods for cleaning up : Evaporates.

There are no special clean-up or disposal requirements for household/industrial spills of this product.

7. HANDLING AND STORAGE

Handling

Advice on safe handling : Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. 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 : 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. 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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Chemical Name	Occupational Exposure Limits		Regulation
Pentafluoroethane	AEL *	1,000 ppm	DuPont AEL (2011)
1,1,1,2-Tetrafluoroethane	AEL *	1,000 ppm	DuPont AEL (02 2012)
	TWA	1,000 ppm, 4,240 mg/m3	Australia. OELs. (Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment) (08 2005)
Chloropentafluoroethane	TWA	1,000 ppm	US. ACGIH Threshold Limit Values (2011)
	TWA	1,000 ppm, 6,320 mg/m3	Australia. OELs. (Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment) (08 2005)

Engineering measures

Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released.

Personal protective equipment

Respiratory protection : For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Hand protection : Material: Impervious gloves

Eye protection	:	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.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	Liquefied gas
Colour	:	colourless
Odour	:	slight , ether-like
pH	:	neutral
Melting point	:	Not available for this mixture.
Boiling point	:	-46.2 °C
Flash point	:	does not flash
Thermal decomposition	:	728 °C
Vapour pressure	:	12,546 hPa at 25 °C
		23,100 hPa at 50 °C
Density	:	1.05 g/cm3 at 25 °C (as liquid)
Relative vapour density	:	3.4 at 25°C (77°F) and 1013 hPa (Air=1.0)

10. STABILITY AND REACTIVITY

Conditions to avoid	:	The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised 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. Avoid open flames and high temperatures.
Materials to avoid	:	Alkali metals, Alkaline earth metals, Powdered metals, Powdered metal salts
Hazardous decomposition products	:	Hazardous thermal decomposition products may include:, Hydrogen fluoride, Carbon oxides, Fluorocarbons, Carbonyl fluoride
Hazardous reactions	:	Stable at normal temperatures and storage conditions.

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity

- 1,1,1-Trifluoroethane : not applicable

Acute inhalation toxicity

- 1,1,1-Trifluoroethane : LC50/4 h/rat : 591000 ppm

  Low Observed Adverse Effect Concentration (LOAEC)//dog : 300000 ppm
  Cardiac sensitization

  No Observed Adverse Effect Concentration (NOAEC)//dog : 250000 ppm
  Cardiac sensitization

- Pentafluoroethane : LC50/4 h/rat : > 800000 ppm

  Low Observed Adverse Effect Concentration (LOAEC)//dog : 100000 ppm
  Cardiac sensitization

  No Observed Adverse Effect Concentration (NOAEC)//dog : 75000 ppm
  Cardiac sensitization

- 1,1,1,2-Tetrafluoroethane : LC50/4 h/rat : 567000 ppm

  Low Observed Adverse Effect Concentration (LOAEC)//dog : 75000 ppm
  Cardiac sensitization

  No Observed Adverse Effect Concentration (NOAEC)//dog : 50000 ppm
  Cardiac sensitization

Acute dermal toxicity

- 1,1,1-Trifluoroethane : not applicable

Skin irritation

- 1,1,1-Trifluoroethane : Not tested on animals
  Classification: Not classified as irritant Result: No skin irritation Not expected to cause skin irritation based on expert review of the properties of the substance.

- Pentafluoroethane : Not tested on animals
  Classification: Not classified as irritant Result: No skin irritation Not expected to cause skin irritation based on expert review of the properties of the substance.

- 1,1,1,2-Tetrafluoroethane : rabbit
  Classification: Not classified as irritant Result: No skin irritation slight irritation Not expected to cause skin irritation based on expert review of the properties of the substance.

  human
  Classification: Not classified as irritant Result: No skin irritation

Eye irritation

- 1,1,1-Trifluoroethane : Not tested on animals
  Classification: Not classified as irritant Result: No eye irritation Not expected to cause eye irritation based on expert review of the properties of the substance.

- Pentafluoroethane : Not tested on animals
  Classification: Not classified as irritant Result: No eye irritation Not expected to cause eye irritation based on expert review of the properties of the substance.

- 1,1,1,2-Tetrafluoroethane : rabbit
  Classification: Not classified as irritant Result: No eye irritation slight irritation Not expected to cause eye irritation based on expert review of the properties of the substance.

  human
  Classification: Not classified as irritant Result: No eye irritation

Sensitisation

- 1,1,1-Trifluoroethane : Not tested on animals Classification: Not a skin sensitizer. Not expected to cause sensitization based on expert review of the properties of the substance.

  There are no reports of human respiratory sensitization.

- Pentafluoroethane : Not tested on animals Classification: Not a skin sensitizer. Result: Does not cause skin sensitisation. Not expected to cause sensitization based on expert review of the properties of the substance.

  There are no reports of human respiratory sensitization.

- 1,1,1,2-Tetrafluoroethane : guinea pig Classification: Not a skin sensitizer. Result: Does not cause skin sensitisation. Not expected to cause sensitization based on expert review of the properties of the substance.

  Result: Does not cause respiratory sensitisation. Did not cause sensitisation on laboratory animals. There are no reports of human respiratory sensitization.

Repeated dose toxicity

- 1,1,1-Trifluoroethane : Inhalation, rat
  No toxicologically significant effects were found.

- Pentafluoroethane : Inhalation, rat
  No toxicologically significant effects were found.

- 1,1,1,2-Tetrafluoroethane : Inhalation, rat
  No toxicologically significant effects were found.

Mutagenicity assessment

- 1,1,1-Trifluoroethane : 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.
- Pentafluoroethane : 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.

• 1,1,1,2-Tetrafluoroethane	:	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.

Carcinogenicity assessment

• 1,1,1-Trifluoroethane	:	Animal testing did not show any carcinogenic effects.
• Pentafluoroethane	:	Overall weight of evidence indicates that the substance is not carcinogenic.
• 1,1,1,2-Tetrafluoroethane	:	Overall weight of evidence indicates that the substance is not carcinogenic. An increased incidence of benign tumours was observed in laboratory animals.

Toxicity to reproduction assessment

• Pentafluoroethane	:	Evidence suggests the substance is not a reproductive toxin in animals. Information given is based on data obtained from similar substances.
• 1,1,1,2-Tetrafluoroethane	:	Animal testing showed no reproductive toxicity.

Assessment teratogenicity

• 1,1,1-Trifluoroethane	:	Animal testing showed no developmental toxicity.
• Pentafluoroethane	:	Animal testing showed no developmental toxicity.
• 1,1,1,2-Tetrafluoroethane	:	Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.

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

Inhalation: Severe shortness of breath, narcosis, Irregular cardiac activity

12. ECOLOGICAL INFORMATION

Toxicity to fish

• 1,1,1-Trifluoroethane	:	LC50/96 h/Oncorhynchus mykiss (rainbow trout): > 100 mg/l
• Pentafluoroethane	:	LC50/96 h/Danio rerio (zebra fish): > 200 mg/l Information given is based on data obtained from similar substances. LC50/96 h/Oncorhynchus mykiss (rainbow trout): 450 mg/l Information given is based on data obtained from similar substances.
• 1,1,1,2-Tetrafluoroethane	:	LC50/96 h/Oncorhynchus mykiss (rainbow trout): 450 mg/l

Toxicity to algae

• Pentafluoroethane	:	EC50/96 h/Algae: 142 mg/l Information given is based on data obtained from similar substances.
• 1,1,1,2-Tetrafluoroethane	:	EC50/72 h/Algae: > 118 mg/l Information given is based on data obtained from similar substances.

Aquatic toxicity

• 1,1,1-Trifluoroethane	:	EC50/48 h/Daphnia: 300 mg/l

• Pentafluoroethane	:	EC50/48 h/Daphnia magna (Water flea): > 200 mg/l Information given is based on data obtained from similar substances.
• 1,1,1,2-Tetrafluoroethane	:	EC50/48 h/Daphnia magna (Water flea): 980 mg/l
Ozone depletion potential	:	0

13. DISPOSAL CONSIDERATIONS

Product	:	Can be used after re-conditioning. In accordance with local and national regulations. Dispose of in accordance with local regulations.
Contaminated packaging	:	Empty pressure vessels should be returned to the supplier. Disposable containers: Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

ADG

UN number		3337
Proper shipping name	:	Refrigerant gas R 404A
Class	:	2.2
Hazchem Code	:	2TE

IMDG

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

IATA_C

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

Further information : Classified as dangerous goods according to the ADG Code

15. REGULATORY INFORMATION

Further information : Not classified as hazardous according to criteria of NOHSC.

National regulatory information

SUSMP : No poison schedule number allocated

Safety data sheet available for professional user on request. Contains fluorinated greenhouse gas covered by

the Kyoto Protocol. HFC-143a HFC-125 HFC-134a

16. OTHER INFORMATION

Sources of key data used to compile the Safety Data Sheet:

1. National Code of Practice for the Preparation of Material Safety Data Sheets 2nd Edition [NOHSC:2011(2003)]
2. Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(1999)]
3. List of Designated Hazardous Substances [NOHSC:10005(1999)]
4. Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995)]
5. Australian Code for the Transport of Dangerous Goods by Road & Rail No. 7 [National Transport Commission]
6. Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP)
7. National Code of Practice for the Labelling of Workplace Substances [NOHSC:2012(1994)]

Department:

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Macquarie Park NSW 2113
Australia

Further information:

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

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

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