DuPont™ Suva® 407C Refrigerant

Version 3.1
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This SDS adheres to the standards and regulatory requirements of Malaysia and may not meet the regulatory requirements in other countries.

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

Product name : DuPont™ Suva® 407C Refrigerant
: ASHRAE Refrigerant number designation: R-407C

Other names : Suva® 9000
R-407C
Suva® R-407C
407C
HFC 407C

Recommended use of the chemical and restriction on use
Recommended use : Refrigerant, For professional users only.

Manufacturer, importer, supplier
Company : Du Pont Malaysia Sdn Bhd
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Malaysia
Telephone : +60 3 2859 0700
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Emergency telephone number : 1800-82-0055

2. HAZARDS IDENTIFICATION

Product hazard classification
Gases under pressure : Liquefied gas

Endpoints which are not classified, cannot be classified or are not applicable are not shown.

Label content
Pictogram :

Signal word : Warning

Hazardous warnings : Contains gas under pressure; may explode if heated.

Precautionary statements : Protect from sunlight. Store in a well-ventilated place.

Other 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.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture

Components

Chemical Name	CAS-No.	Concentration
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	52 %
Pentafluoroethane (HFC-125)	354-33-6	25 %
Difluoromethane (HFC-32)	75-10-5	23 %

4. FIRST AID MEASURES

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. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.

Skin contact : Take off contaminated clothing and shoes immediately. Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.

Eye contact : Rinse immediately with plenty of water and seek medical advice.

Ingestion : Is not considered a potential route of exposure.

Most important symptoms/effects, acute and delayed : Anaesthetic effects, Light-headedness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness

Protection of first-aiders : If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Notes to physician : Do not give adrenaline or similar drugs.

5. FIREFIGHTING MEASURES

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

Specific hazards : Pressure build-up.

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.

Specific extinguishing methods : No information available.

Further information : 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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : 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.
In accordance with local and national regulations.

Methods and materials for containment and cleaning up : Evaporates.
Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect.

7. HANDLING AND STORAGE

Handling

Technical measures/Precautions : Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.

Precautions for safe handling : No special protective measures against fire required.

Storage

Suitable storage conditions : 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.

Storage period: > 10 yr
Storage temperature: < 52 °C
The product has an indefinite shelf life when stored properly.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

No information available.

Engineering measures : Ensure adequate ventilation, especially in confined areas.

Biological occupational exposure limits : No information available.

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 : Heat insulating gloves

Eye protection : No information available.

Skin protection : No information available.

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (Physical state, form, colour, etc.)
Physical state : gaseous
Form : Liquefied gas
Colour : colourless

Odour : slight ether-like

Odour Threshold : No information available.

pH : (25 °C)
neutral

Melting point/freezing point
Melting point/range : Not available for this mixture.

Initial boiling point and boiling range
Boiling point : -43.6 °C

Flash point : does not flash

Evaporation rate : No information available.

Flammability (solid, gas) : No information available.

Upper/lower flammability or explosive limits
Upper explosion limit : No information available.
Lower explosion limit : No information available.

Vapour pressure : 11,903 hPa (25 °C)

21,860 hPa (50 °C)

Vapour density : No information available.

Density
Density : 1.136 g/cm3 (25 °C)
(as liquid)

0.0042 g/cm3 (25 °C) (1,013 hPa)
Specific gravity : 1.14 (25 °C)
(Relative density)

Solubility(ies)
Water solubility : not determined

Partition coefficient: n-octanol/water : No information available.

Auto-ignition temperature
Ignition temperature : 685 °C

Decomposition temperature : No information available.

Viscosity
Viscosity, kinematic : No information available.

Molecular weight : No information available.

10. STABILITY AND REACTIVITY

Reactivity : Stable at normal ambient temperature and pressure.

Chemical stability : Stable under recommended storage conditions.

Possibility of hazardous reactions : No information available.

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.

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

SECTION 11: TOXICOLOGICAL INFORMATION

Acute toxicity
Inhalation

1,1,1,2-Tetrafluoroethane (HFC-134a) :
LC50/4 h/Rat(gas): > 567000 ppm
No Observed Adverse Effect Concentration/Dog(gas): 40000 ppm
Cardiac sensitization
Low Observed Adverse Effect Concentration (LOAEC)/Dog(gas): 80000 ppm
Cardiac sensitization

Pentafluoroethane (HFC-125) :
LC50/4 h/Rat(gas): > 800000 ppm
Method: OECD Test Guideline 403
No Observed Adverse Effect Concentration/Dog(gas): 100000 ppm
Cardiac sensitization
Low Observed Adverse Effect Concentration (LOAEC)/Dog(gas): 75000 ppm
Cardiac sensitization

Difluoromethane (HFC-32) :
LC50/4 h/Rat(gas): > 520000 ppm
Low Observed Adverse Effect Concentration (LOAEC)/Dog: > 350000 ppm
Cardiac sensitization
No Observed Adverse Effect Concentration/Dog: 350000 ppm
Cardiac sensitization

Skin corrosion/irritation

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	Species: Rabbit Result: No skin irritation Classification: Not classified as irritant
Difluoromethane (HFC-32)	:	Species: Not tested on animals Result: No skin irritation Classification: Not classified as irritant Not expected to cause skin irritation based on expert review of the properties of the substance.

Serious eye damage/eye irritation

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	Species: Rabbit Result: No eye irritation Classification: Not classified as irritant
Difluoromethane (HFC-32)	:	Species: Not tested on animals Result: No eye irritation Classification: Not classified as irritant Not expected to cause eye irritation based on expert review of the properties of the substance.

Respiratory or skin sensitisation

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	Species: Guinea pig Result: Does not cause skin sensitisation. Classification: Does not cause skin sensitisation. Species: Rat Result: Does not cause respiratory sensitisation. Classification: Does not cause respiratory sensitisation.
Pentafluoroethane (HFC-125)	:	Species: human Result: Does not cause respiratory sensitisation. Classification: Does not cause respiratory sensitisation.
Difluoromethane (HFC-32)	:	Species: Not tested on animals 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.

Germ cell mutagenicity

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Pentafluoroethane (HFC-125)	:	Animal testing did not show any mutagenic effects. Evidence suggests this substance does not cause genetic damage in cultured mammalian cells. Did not cause genetic damage in cultured bacterial cells.
Difluoromethane (HFC-32)	:	Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Carcinogenicity

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.
Pentafluoroethane (HFC-125)	:	Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.

Reproductive toxicity

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	Reproductive toxicity: No toxicity to reproduction No effects on or via lactation Animal testing showed no reproductive toxicity. Teratogenicity: Animal testing showed no developmental toxicity.
Pentafluoroethane (HFC-125)	:	Reproductive toxicity: No toxicity to reproduction Animal testing showed no reproductive toxicity. Teratogenicity: Animal testing showed no developmental toxicity.
Difluoromethane (HFC-32)	:	Reproductive toxicity: No toxicity to reproduction Animal testing showed no reproductive toxicity. Information given is based on data obtained from similar substances. Teratogenicity: Animal testing showed no developmental toxicity.

Specific Target Organ Toxicity

Specific target organ toxicity - single exposure

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	The substance or mixture is not classified as specific target organ toxicant, single exposure.
Pentafluoroethane (HFC-125)	:	The substance or mixture is not classified as specific target organ toxicant, single exposure.
Difluoromethane (HFC-32)	:	The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ toxicity - repeated exposure

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.
Pentafluoroethane (HFC-125)	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.
Difluoromethane (HFC-32)	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	No aspiration toxicity classification
Pentafluoroethane (HFC-125)	:	No aspiration toxicity classification
Difluoromethane (HFC-32)	:	No aspiration toxicity classification

Other

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	Repeated dose toxicity: Inhalation/Rat gas NOAEL: 50000, No toxicologically significant effects were found.
Pentafluoroethane (HFC-125)	:	Repeated dose toxicity: Inhalation/Rat gas NOAEL: > 50000, No toxicologically significant effects were found.
Difluoromethane (HFC-32)	:	Repeated dose toxicity: Inhalation/Rat No toxicologically significant effects were found.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity effects

Acute and prolonged toxicity to fish

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	LC50/96 h/Oncorhynchus mykiss (rainbow trout): 450 mg/l
Pentafluoroethane (HFC-125)	:	LC50/96 h/Oncorhynchus mykiss (rainbow trout): 450 mg/l Information given is based on data obtained from similar substances.
Difluoromethane (HFC-32)	:	LC50/96 h/Fish: 1,507 mg/l

Toxicity to aquatic plants

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	ErC50/96 h/Algae: 142 mg/l Information given is based on data obtained from similar substances. NOEC/72 h/Pseudokirchneriella subcapitata (green algae): 13.2 mg/l Information given is based on data obtained from similar substances.
Pentafluoroethane (HFC-125)	:	ErC50/96 h/Algae: 142 mg/l Information given is based on data obtained from similar substances. NOEC/72 h/Pseudokirchneriella subcapitata (green algae): 13.2 mg/l Information given is based on data obtained from similar substances.
Difluoromethane (HFC-32)	:	EC50/96 h/Algae: 142 mg/l

Acute toxicity to aquatic invertebrates

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	EC50/48 h/Daphnia magna (Water flea): 980 mg/l
Pentafluoroethane (HFC-125)	:	EC50/48 h/Daphnia magna (Water flea): 980 mg/l Information given is based on data obtained from similar substances.
Difluoromethane (HFC-32)	:	EC50/48 h/Daphnia (water flea): 652 mg/l

Chronic toxicity to fish

Difluoromethane (HFC-32)	:	NOEC/30 d/Fish (unspecified species): 65.8 mg/l

Persistence and degradability

1,1,1,2-Tetrafluoroethane (HFC-134a)	:	Result: Not biodegradable
Pentafluoroethane (HFC-125)	:	Result: Not rapidly biodegradable
Difluoromethane (HFC-32)	:	Exposure time: 28 d Biodegradation: 5 % Not readily biodegradable.

Bioaccumulation

No information available.

Mobility in soil

No information available.

Hazardous to the ozone layer

DuPont™ Suva® 407C Refrigerant	:	Ozone-Depletion Potential: 0

Other adverse effects

No information available.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods : Can be used after re-conditioning. In accordance with local and national regulations.

Contaminated packaging : Empty pressure vessels should be returned to the supplier.
Disposable containers: Dispose of in accordance with local regulations.

SECTION 14: TRANSPORT INFORMATION

IMDG

UN number	:	3340
Proper shipping name	:	REFRIGERANT GAS R 407C
Class	:	2.2
Marine pollutant	:	no

IATA

UN number	:	3340
Proper shipping name	:	REFRIGERANT GAS R 407C
Class	:	2.2

Matters needing attention for transportation : Not applicable

SECTION 15: REGULATORY INFORMATION

Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013.

16. OTHER INFORMATION

References

SDS Number: 130000000517

Revision Date/Version

Date of first preparation	:	03.12.2007
Revision Date	:	31.03.2015
Version	:	3.1

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