

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

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/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name : DuPont™ SUVA® 407C refrigerant
Types : ASHRAE Refrigerant number designation: R-407C
Synonyms : SUVA® 9000

Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture : Refrigerant

Details of the supplier of the safety data sheet

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

Telephone : +31-78-630.1011

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

Emergency telephone number

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

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC.

Label elements

Special labelling of certain substances and mixtures : Safety data sheet available on request for professional users.
Contains: Difluoromethane, Pentafluoroethane, 1,1,1,2-Tetrafluoroethane / Contains fluorinated greenhouse gas covered by the Kyoto Protocol.

The product does not need to be labelled in accordance with Directive 1999/45/EC, or Annex VI to 67/548/EEC.

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

Other hazards

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

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances

not applicable

Mixtures

Registration number	Classification according Directive 67/548/EEC	Classification according Regulation 1272/2008 (CLP)	Concentration
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Difluoromethane (CAS-No.75-10-5) (EC-No.200-839-4)

01-2119471312-47	F+;R12	Flam. Gas 1; H220 Press. Gas H280	23 %
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Pentafluoroethane (CAS-No.354-33-6) (EC-No.206-557-8)

01-2119485636-25		Press. Gas H280	25 %
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1,1,1,2-Tetrafluoroethane (CAS-No.811-97-2) (EC-No.212-377-0)

01-2119459374-33		Press. Gas H280	52 %
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For the full text of the R-phrases mentioned in this Section, see Section 16.
For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

Description of 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. 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 : Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.
- Ingestion : Is not considered a potential route of exposure.

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

Most important symptoms and effects, both acute and delayed

Symptoms : Skin contact may provoke the following symptoms:, Frostbite, Inhalation may provoke the following symptoms:, Shortness of breath, Dizziness, Weakness, Nausea, Headache, narcosis, Irregular cardiac activity

Indication of any immediate medical attention and special treatment needed

Treatment : Do not give adrenaline or similar drugs.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media : Water spray, Foam, Dry chemical, Carbon dioxide (CO2)

Special hazards arising from the substance or mixture

Specific hazards during fire fighting : Vapours may form explosive mixtures with air. Vapours are heavier than air and may spread along floors. Vapours or gases may travel considerable distances to ignition source and flash back. Fire or intense heat may cause violent rupture of packages.

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

Advice for firefighters

Special protective equipment for fire-fighters : 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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

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

Environmental precautions : Should not be released into the environment.

Methods and materials for containment and cleaning up

Methods for cleaning up : Evaporates.

Reference to other sections

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

not applicable

7. HANDLING AND STORAGE

Precautions for safe 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.

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Do not drag, slide or roll cylinders. 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. Keep at temperature not exceeding 52°C. Keep containers tightly closed in a dry, cool and well-ventilated place. Store in original container. Protect from contamination.

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

Storage temperature : < 52 °C

Specific end uses

no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

If sub-section is empty then no values are applicable.

Components with workplace control parameters

Type Form of exposure	Control parameters	Update	Basis	Remarks
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1,1,1,2-Tetrafluoroethane (CAS-No. 811-97-2)

TWA	4 240 mg/m3 1 000 ppm	2007	EH40 WEL	
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Derived No Effect Level

- Difluoromethane : Type of Application (Use): Workers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 7 035 mg/m3

: Type of Application (Use): Consumers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 750 mg/m3

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

: Value: 73 mg/l
Compartment: Water
Remarks: Sewage treatment plants

Exposure controls

- Engineering measures : Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released.
- 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.
- Hand protection : Material: Heat insulating gloves
- Skin and body protection : impervious clothing
- Protective measures : When using do not smoke.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
- 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

- Form : Liquefied gas
- Colour : colourless
- Odour : slight, ether-like
- Boiling point : -43,6 °C
- Flash point : does not flash
- Ignition temperature : 685 °C
- Vapour pressure : 11 903 hPa at 25 °C
: 21 860 hPa at 50 °C
- Density : 1,136 g/cm³ at 25 °C, (as liquid)
: 0,0042 g/cm³ at 25 °C (1 013 hPa)
- Water solubility : not determined

Other information

no data available

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

10. STABILITY AND REACTIVITY

- Reactivity** : Decomposes on heating.
- Chemical stability** : The product is chemically stable.
- Possibility of hazardous reactions** : Stable at normal temperatures and storage conditions.
- 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.
- Incompatible materials** : Alkali metals Alkaline earth metals Powdered metals Powdered metal salts
- Hazardous decomposition products** : Hazardous thermal decomposition products:
Carbon oxides
Hydrogen fluoride
Carbonyl fluoride
Fluorocarbons

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute oral toxicity

- Difluoromethane
not applicable
- Pentafluoroethane
not applicable
- 1,1,1,2-Tetrafluoroethane
not applicable

Acute inhalation toxicity

- Difluoromethane
LC50 / rat :> 520 000 ppm

/ dog
Not a cardiac sensitizer.
- Pentafluoroethane
LC50 / rat :> 800 000 ppm

/ dog
Cardiac sensitization
- 1,1,1,2-Tetrafluoroethane
LC50 / rat :567 000 ppm

/ dog
Cardiac sensitization

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

Acute dermal toxicity

- Difluoromethane
not applicable
- Pentafluoroethane
not applicable
- 1,1,1,2-Tetrafluoroethane
not applicable

Skin irritation

- Difluoromethane
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: 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

- Difluoromethane
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: slight irritation
Not expected to cause eye irritation based on expert review of the properties of the substance.

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

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

Sensitisation

- Difluoromethane
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 sensitization.
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: Did not cause sensitization on laboratory animals.
Not expected to cause sensitization based on expert review of the properties of the substance.

Did not cause sensitization on laboratory animals. There are no reports of human respiratory sensitization.

Repeated dose toxicity

- Difluoromethane
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

- Difluoromethane
Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
- Pentafluoroethane
Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
- 1,1,1,2-Tetrafluoroethane
Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

Carcinogenicity assessment

- Difluoromethane
Not classifiable as a human carcinogen.
- Pentafluoroethane
Not classifiable as a human carcinogen.
- 1,1,1,2-Tetrafluoroethane
Not classifiable as a human carcinogen.

Toxicity to reproduction assessment

- Difluoromethane
No toxicity to reproduction
- Pentafluoroethane
No toxicity to reproduction
- 1,1,1,2-Tetrafluoroethane
No toxicity to reproduction

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. May cause cardiac arrhythmia.

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish

- Difluoromethane
LC50 / 96 h / Fish: 1 507 mg/l
- Pentafluoroethane
LC50 / 96 h / *Oncorhynchus mykiss* (rainbow trout): > 81,8 mg/l
Information given is based on data obtained from similar substances.

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

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

Toxicity to aquatic plants

- Difluoromethane
EC50 / 96 h / Algae: 142 mg/l
- Pentafluoroethane
EC50 / 72 h / Pseudokirchneriella subcapitata (green algae): > 118 mg/l
Information given is based on data obtained from similar substances.

EC50 / 72 h / Pseudokirchneriella subcapitata (green algae): > 114 mg/l
Information given is based on data obtained from similar substances.

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.

Toxicity to aquatic invertebrates

- Difluoromethane
EC50 / 48 h / Daphnia: 652 mg/l
- Pentafluoroethane
EC50 / 48 h / Daphnia magna (Water flea): > 200 mg/l
Information given is based on data obtained from similar substances.

EC50 / 48 h / Daphnia magna (Water flea): > 97,9 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

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

Results of PBT and vPvB assessment

no data available

Other adverse effects

Ozone depletion potential

0

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

Global warming potential (GWP)

1 774

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

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

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: 3340
Labelling No.: 2.2
Proper shipping name: Refrigerant gas R 407C
Tunnel restriction code: (C/E)

IATA_C

Class: 2.2
UN number: 3340
Labelling No.: 2.2
Proper shipping name: Refrigerant gas R 407C

IMDG

Class: 2.2
UN number: 3340
Labelling No.: 2.2
Proper shipping name: Refrigerant gas R 407C

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

Chemical Safety Assessment

no data available

16. OTHER INFORMATION

Text of R-phrases mentioned in Section 3

R12 Extremely flammable.

Full text of H-Statements referred to under section 3.

H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.

SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 and 453/2010



DuPont™ SUVA® 407C refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000517

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

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

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 guide 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.