

# SAFETY DATA SHEET

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



## DuPont™ SUVA® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

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® 404A refrigerant  
Types : ASHRAE Refrigerant number designation: R-404A  
Synonyms : HP62

#### 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: 1,1,1-Trifluoroethane, 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® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

### 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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#### 1,1,1-Trifluoroethane (CAS-No.420-46-2) (EC-No.206-996-5)

01-2119492869-13	F+;R12	Flam. Gas 1; H220 Press. Gas H280	52 %
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#### Pentafluoroethane (CAS-No.354-33-6) (EC-No.206-557-8)

01-2119485636-25		Press. Gas H280	44 %
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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	4 %
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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. Call a physician.
- Skin contact : Take off all contaminated clothing 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® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

### 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® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

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

- 1,1,1-Trifluoroethane : Type of Application (Use): Workers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 38 800 mg/m3  
  
: Type of Application (Use): Consumers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 10 700 mg/m3

# SAFETY DATA SHEET

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



## DuPont™ SUVA® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

- Pentafluoroethane : Type of Application (Use): Workers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 16 444 mg/m3  
  
: Type of Application (Use): Consumers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 1 753 mg/m3
- 1,1,1,2-Tetrafluoroethane : Type of Application (Use): Workers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 13 936 mg/m3  
  
: Type of Application (Use): Consumers  
Exposure routes: Inhalation  
Health Effect: Chronic effects, Systemic toxicity  
Value: 2 476 mg/m3

### Predicted No Effect Concentration

- 1,1,1-Trifluoroethane : Value: 350 mg/l  
Compartment: Fresh water
- Pentafluoroethane : Value: 0,1 mg/l  
Compartment: Fresh water  
  
: Value: 1 mg/l  
Compartment: Water  
Remarks: Intermittent use/release  
  
: Value: 0,6 mg/kg  
Compartment: Fresh water sediment
- 1,1,1,2-Tetrafluoroethane : Value: 0,1 mg/l  
Compartment: Fresh water  
  
: Value: 0,01 mg/l  
Compartment: Marine water  
  
: Value: 1 mg/l  
Compartment: Water  
Remarks: Intermittent use/release  
  
: Value: 0,75 mg/kg  
Compartment: Fresh water sediment  
  
: Value: 73 mg/l  
Compartment: Water  
Remarks: Sewage treatment plants

### Exposure controls

- Engineering measures : Ensure adequate ventilation, especially in confined areas. Local exhaust should

# SAFETY DATA SHEET

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



## DuPont™ SUVA® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

	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/boiling range	: -45,5 °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/cm <sup>3</sup> at 25 °C, (as liquid)

#### Other information

no data available

### 10. STABILITY AND REACTIVITY

<b>Reactivity</b>	: Decomposes on heating.
<b>Chemical stability</b>	: The product is chemically stable.
<b>Possibility of hazardous reactions</b>	: Stable at normal temperatures and storage conditions.
<b>Conditions to avoid</b>	: The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become

# SAFETY DATA SHEET

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



## DuPont™ SUVA® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

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 may include:  
Carbon oxides  
Hydrogen fluoride  
Carbonyl fluoride  
Fluorocarbons

### 11. TOXICOLOGICAL INFORMATION

#### Information on toxicological effects

##### Acute oral toxicity

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

##### Acute inhalation toxicity

- 1,1,1-Trifluoroethane  
LC50 / rat :591 000 ppm  
  
/ dog  
Cardiac sensitization
- Pentafluoroethane  
LC50 / rat :> 800 000 ppm  
  
/ dog  
Cardiac sensitization
- 1,1,1,2-Tetrafluoroethane  
LC50 / rat :567 000 ppm  
  
/ dog  
Cardiac sensitization

##### Acute dermal toxicity

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

# SAFETY DATA SHEET

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



## DuPont™ SUVA® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

### 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: 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: 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.



# SAFETY DATA SHEET

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



## DuPont™ SUVA® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

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

- 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  
Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show 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.

### Carcinogenicity assessment

- 1,1,1-Trifluoroethane  
Animal testing did not show any carcinogenic effects.  
  
Not classifiable as a human carcinogen.

# SAFETY DATA SHEET

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



## DuPont™ SUVA® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

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

### Toxicity to reproduction assessment

- 1,1,1-Trifluoroethane  
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

- 1,1,1-Trifluoroethane  
LC50 / 96 h / *Oncorhynchus mykiss* (rainbow trout): > 100 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

#### Toxicity to aquatic plants

- 1,1,1-Trifluoroethane  
not applicable
- Pentafluoroethane

# SAFETY DATA SHEET

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



## DuPont™ SUVA® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

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

- 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.

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

Global warming potential (GWP)

3 922

# SAFETY DATA SHEET

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



## DuPont™ SUVA® 404A refrigerant

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

### 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: 3337  
Labelling No.: 2.2  
Proper shipping name: Refrigerant gas R 404A  
Tunnel restriction code: (C/E)

#### IATA\_C

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

#### IMDG

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

### 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.

#### 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

# SAFETY DATA SHEET

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



## **DuPont™ SUVA® 404A refrigerant**

Version 3.0

Revision Date 12.05.2011

Ref.130000000494

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.