



DuPont™ SUVA® 404A refrigerant

Version 4.0

Revision Date 21.11.2012

Ref. 130000000494

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

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name : DuPont™ SUVA® 404A refrigerant
Types : ASHRAE Refrigerant number designation: R-404A
Synonyms : HP62

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

Use of the Substance/Mixture Refrigerant

1.3. 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

1.4. Emergency telephone number

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

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

2.2. Label elements

Special labelling of certain substances and mixtures Safety data sheet available for professional user on request.

Contains: 1,1,1-Trifluoroethane, Pentafluoroethane, 1,1,1,2-Tetrafluoroethane /
Contains fluorinated greenhouse gas covered by the Kyoto Protocol., HFC-
143a, HFC-125, HFC-134a

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

2.3. Other hazards



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- || Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
- || Rapid evaporation of the liquid may cause frostbite.
- || Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.
- || May cause cardiac arrhythmia.

SECTION 3: Composition/information on ingredients

3.1. Substances

not applicable

3.2. 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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The above products are REACH compliant; Registration number(s) may not be provided because substance(s) are exempted, not yet registered under REACH or are registered under another regulatory process (biocide uses, plant protection products), etc.

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.

SECTION 4: First aid measures

4.1. Description of first aid measures

- || General advice : If unconscious place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person. If breathing is irregular or stopped, administer artificial respiration.
- || : First aider needs to protect himself.
- || : If symptoms persist, call a physician.
- Inhalation : Move to fresh air. Keep patient warm and at rest.
- : Remove from exposure, lie down. Artificial respiration and/or oxygen may be



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

4.2. Most important symptoms and effects, both acute and delayed

- ||| Symptoms : 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
- || : Skin contact may provoke the following symptoms: Frostbite, Irritation, Discomfort, Itching, Redness, Swelling of tissue
- || : Eye contact may provoke the following symptoms: Frostbite, Irritation, Tearing, redness, or discomfort.

4.3. Indication of any immediate medical attention and special treatment needed

- Treatment : Do not give adrenaline or similar drugs.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment., Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2. Special hazards arising from the substance or mixture

- Specific hazards during firefighting : Pressure build-up.
- : Fire or intense heat may cause violent rupture of packages.
- : Exposure to decomposition products may be a hazard to health.
- : Fluorinated compounds
- : Hydrogen fluoride
- : Carbon oxides
- : Hazardous thermal decomposition products:

5.3. Advice for firefighters

- 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



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fire.

Further information : Cool containers / tanks with water spray.

SECTION 6: Accidental release measures

6.1. 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.

6.2. Environmental precautions

Environmental precautions : Should not be released into the environment.
In accordance with local and national regulations.

6.3. Methods and materials for containment and cleaning up

Methods for cleaning up : Evaporates.

6.4. Reference to other sections

For disposal instructions see section 13.

SECTION 7: Handling and storage

7.1. 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.

Vapours are heavier than air and may spread along floors.

Advice on protection against fire and explosion : 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.

7.2. 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. Protect from contamination. Protect cylinders from damage. Keep away from direct sunlight. Store only in approved containers.

Advice on common storage : No materials to be especially mentioned. For further information see Section 10 of the safety data sheet.

Storage temperature : < 52 °C



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7.3. Specific end use(s)

no data available

SECTION 8: Exposure controls/personal protection

8.1. 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
1,1,1,2-Tetrafluoroethane (CAS-No. 811-97-2)				
TWA	4,240 mg/m3 1,000 ppm	2007	EH40 WEL	

Derived No Effect Level (DNEL)

- 1,1,1-Trifluoroethane : Type of Application (Use): Workers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 38800 mg/m3
- : Type of Application (Use): Consumers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 10700 mg/m3
- Pentafluoroethane : Type of Application (Use): Workers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 16444 mg/m3
- : Type of Application (Use): Consumers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 1753 mg/m3
- 1,1,1,2-Tetrafluoroethane : Type of Application (Use): Workers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 13936 mg/m3
- : Type of Application (Use): Consumers
Exposure routes: Inhalation
Health Effect: Chronic effects, Systemic toxicity
Value: 2476 mg/m3



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Predicted No Effect Concentration (PNEC)

- 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 dry weight (d.w.)
Compartment: Fresh water sediment

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

8.2. Exposure controls

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

Eye protection : Wear safety glasses or coverall chemical splash goggles.
Eye protection complying with EN 166.
or
ANSI Z87.1
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: Leather gloves
The suitability for a specific workplace should be discussed with the producers of the protective gloves.

II : Material: Low temperature resistant gloves

II : Protective gloves complying with EN 374. or US OSHA guidelines



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The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

Skin and body protection : Wear suitable protective equipment. Wear as appropriate: impervious clothing



Protective measures : Self-contained breathing apparatus (SCBA) is required if a large release occurs. The type of protective equipment must be selected according to the concentration and amount of the substance at the specific workplace.

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. Respiratory protection complying with EN 137.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form : Liquefied gas

Colour : colourless

Odour : slight, ether-like

Melting point : Not available for this mixture.

Boiling point : -46.2 °C

Flash point : does not flash

Thermal decomposition : 728 °C

Lower explosion limit/ lower flammability limit : Type: lower flammability limit, Method: ASTM E681, None.

Upper explosion limit/ upper flammability limit : Type: upper flammability limit, Method: ASTM E681, None.

Vapour pressure : 12,546 hPa at 25 °C

: 23,100 hPa at 50 °C

Density : 1.05 g/cm³ at 25 °C, (as liquid)

9.2. Other information
no data available



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SECTION 10: Stability and reactivity

- 10.1. Reactivity** : Decomposes on heating.
- 10.2. Chemical stability** : The product is chemically stable.
- 10.3. Possibility of hazardous reactions** : Stable under recommended storage conditions.
- 10.4. 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. Pressurized container: Do not pierce or burn, even after use. Keep at temperature not exceeding 52°C.
- 10.5. Incompatible materials** : Alkali metals
Alkaline earth metals
Powdered metals
Powdered metal salts
- 10.6. Hazardous decomposition products** : Hazardous thermal decomposition products may include:
Hydrogen fluoride
Carbon oxides
Fluorocarbons
Carbonyl fluoride

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute oral toxicity

- 1,1,1-Trifluoroethane
not applicable
- Pentafluoroethane
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
- Pentafluoroethane
LC50 / 4 h rat :> 800000 ppm

Low Observed Adverse Effect Concentration (LOAEC) / dog :100000 ppm
Cardiac sensitization
- 1,1,1,2-Tetrafluoroethane



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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
- Pentafluoroethane
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: 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.



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- 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.

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



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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.
- 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

Assessment teratogenicity

- Pentafluoroethane
Did not show teratogenic effects in animal experiments.

Further information

Avoid skin contact with leaking liquid (danger of frostbite).

SECTION 12: Ecological information

12.1. Toxicity

Toxicity to fish

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



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- 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 aquatic plants

- 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.

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.
- 1,1,1,2-Tetrafluoroethane
EC50 / 48 h / Daphnia magna (Water flea): 980 mg/l

12.2. Persistence and degradability

Biodegradability

- 1,1,1-Trifluoroethane
Not readily biodegradable.
- 1,1,1,2-Tetrafluoroethane
/ 28 d
Biodegradation: 3 %
Not readily biodegradable.

12.3. Bioaccumulative potential

Bioaccumulation

- 1,1,1,2-Tetrafluoroethane
Bioaccumulation is unlikely.

12.4. Mobility in soil



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no data available

12.5. Results of PBT and vPvB assessment

no data available

12.6. Other adverse effects

Ozone depletion potential

0

Global warming potential (GWP)

3922

Additional ecological information

IPCC - AR4 (Fourth Assessment Report of the Intergovernmental Panel on Climate Change) - 2007

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- || Product : Can be used after re-conditioning. If re-conditioning is not practicable, dispose of in compliance with local regulations.
- Contaminated packaging : Empty pressure vessels should be returned to the supplier.
- || If recycling is not practicable, dispose of in compliance with local regulations.

SECTION 14: Transport information

ADR

- 14.1. UN number: 3337
- 14.2. UN proper shipping name: Refrigerant gas R 404A
- 14.3. Transport hazard class(es): 2
- 14.4. Packing group: not applicable
- 14.5. Environmental hazards: For further information see Section 12.
- 14.6. Special precautions for user:
Tunnel restriction code: (C/E)

IATA_C

- 14.1. UN number: 3337
- 14.2. UN proper shipping name: Refrigerant gas R 404A
- 14.3. Transport hazard class(es): 2.2
- 14.4. Packing group: not applicable
- 14.5. Environmental hazards: For further information see Section 12.
- 14.6. Special precautions for user:
no data available

IMDG

- 14.1. UN number: 3337
- 14.2. UN proper shipping name: Refrigerant gas R 404A
- 14.3. Transport hazard class(es): 2.2



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- 14.4. Packing group: not applicable
14.5. Environmental hazards : For further information see Section 12.
14.6. Special precautions for user:
no data available
- 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
not applicable

SECTION 15: Regulatory information

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

Other regulations : Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

15.2. Chemical Safety Assessment

Chemical Safety Assessments have been carried out for these substances.

SECTION 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

® DuPont's registered trademark, Before use read DuPont's safety information., For further information contact the local DuPont office or DuPont's nominated distributors.
Based on the physico-chemical hazard assessment of this mixture, it was decided to include inside the main body of the safety data sheet all the relevant information coming from the exposure scenario of the lead/priority substances. Please refer to the safety data sheet of the individual components for additional information on exposure scenario.

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.