

## Safety data sheet

### 1,1,1,3,3,3-Hexafluoropropane (R236fa)

Creation date : 17.03.2011  
Revision date : 06.06.2011

Version : 1.21

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

##### 1.1. Product identifier

###### Product name

1,1,1,3,3,3-Hexafluoropropane (R236fa)

EC No (from EINECS): 425-320-1

CAS No: 690-39-1

Index-Nr.

Chemical formula C3H2F6

REACH Registration number:

01-0000017172-78

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

###### Relevant identified uses

Industrial and professional. Perform risk assessment prior to use., Refrigerant.

###### Uses advised against

Consumer use.

##### 1.3. Details of the supplier of the safety data sheet

###### Company identification

BOC, PO Box 1201, Bluebell, Dublin

E-Mail Address ReachSDS@boc.com

##### 1.4. Emergency telephone number

Emergency phone numbers (24h): 1850 333 435

#### SECTION 2: Hazards identification

##### 2.1. Classification of the substance or mixture

###### Classification acc. to Regulation (EC) No 1272/2008/EC (CLP/GHS)

Press. Gas (Liquefied gas) - Contains gas under pressure; may explode if heated.

###### Classification acc. to Directive 67/548/EEC & 1999/45/EC

###### Risk advice to man and the environment

Liquefied gas.

##### 2.2. Label elements

###### - Labelling Pictograms



###### - Signal word

Warning

###### - Hazard Statements

H280

Contains gas under pressure; may explode if heated.

EIGA-As

Asphyxiant in high concentrations.

#### - Precautionary Statements

##### Precautionary Statement Prevention

None.

##### Precautionary Statement Response

None.

##### Precautionary Statement Storage

P403 Store in a well-ventilated place.

##### Precautionary Statement Disposal

None.

##### 2.3. Other hazards

Contact with liquid may cause cold burns/frost bite.

#### SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

##### 3.1. Substances

1,1,1,3,3,3-Hexafluoropropane (R236fa)

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Contains no other components or impurities which will influence the classification of the product.

##### 3.2. Mixtures

Not applicable.

#### SECTION 4: First aid measures

##### 4.1. Description of first aid measures

###### First Aid General Information:

Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

###### First Aid Inhalation:

Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

###### First Aid Skin / Eye:

In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance. Immediately flush eyes thoroughly with water for at least 15 minutes.

###### First Aid Ingestion:

Ingestion is not considered a potential route of exposure.

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

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause

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narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.

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

None.

### SECTION 5: Fire fighting measures

#### 5.1. Extinguishing media

##### Suitable extinguishing media

All known extinguishants can be used.

#### 5.2. Special hazards arising from the substance or mixture

##### Specific hazards

Exposure to fire may cause containers to rupture/explode.

##### Hazardous combustion products

If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:

Carbonyl fluoride, Hydrogen fluoride, Carbon monoxide.

#### 5.3. Advice for fire-fighters

##### Specific methods

If possible, stop flow of product. Move container away or cool with water from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.

##### Special protective equipment for fire-fighters

In confined space use self-contained breathing apparatus. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to EN 469 will provide a basic level of protection from chemical incidents. EN 469:2005: Protective clothing for fire-fighters. Performance requirements for protective clothing for fire-fighting.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

#### 6.2. Environmental precautions

Try to stop release.

#### 6.3. Methods and material for containment and cleaning up

Ventilate area.

#### 6.4. Reference to other sections

See also sections 8 and 13.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Only experienced and properly instructed persons should handle gases under pressure. The substance must be

handled in accordance with good industrial hygiene and safety procedures. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Do not smoke while handling product. Ensure the complete gas system has been (or is regularly) checked for leaks before use. Refer to supplier's handling instructions. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Keep container valve outlets clean and free from contaminants particularly oil and water. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to transfer gases from one cylinder/container to another. Never use direct flame or electrical heating devices to raise the pressure of a container. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.

#### 7.2. Conditions for safe storage, including any incompatibilities

Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. Containers should be stored in the vertical position and properly secured to prevent falling over. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials. Containers should not be stored in conditions likely to encourage corrosion.

#### 7.3. Specific end use(s)

None.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

No occupational exposure limit.

DNEL not available.

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#### Predicted No Effect Concentrations

Type	Compartment Detail	Value
PNEC	Aquatic	> 0,189 mg/l
PNEC	Sediment	> 0,153 mg/kg d.w.

#### 8.2. Exposure controls

##### Appropriate engineering controls

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Oxygen detectors should be used when asphyxiating gases may be released. The substance must be handled in accordance with good industrial hygiene and safety procedures. Consider work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Provide adequate general or local ventilation.

##### Personal protective equipment

##### Eye and face protection

Wear a face-shield when transfilling and breaking transfer connections. Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases.

##### Skin protection

##### Hand protection

Advice: Wear cold insulating gloves.  
Guideline: EN 511 Protective gloves against cold.

##### Body protection

Protect eyes, face and skin from contact with product.

##### Other protection

Wear working gloves and safety shoes while handling gas cylinders. ISO 20345 Safety footwear.

##### Thermal hazards

If there is a risk of contact with the liquid, all protective equipment should be suitable for extremely low temperatures.

##### Environmental Exposure Controls

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

#### SECTION 9: Physical and chemical properties

##### 9.1. Information on basic physical and chemical properties

##### General information

**Appearance/Colour:** Colourless gas.

**Odour:** Ethereal

**Melting point:** -103 °C

**Boiling point:** -1,4 °C

**Flash point:** Not applicable for gases and gas mixtures.

**Vapour Pressure 25 °C:** 2,274 bar

**Relative density, gas:** 5,2

**Solubility in water:** 725 mg/l

**Partition coefficient: n-octanol/water:** 1,12 logPow

**Explosive properties:**

Explosive acc. EU legislation: Not explosive.

Explosive acc. transp. reg.: Not explosive.

**Molecular weight:** 152 g/mol

**Relative density, liquid:** 1,38

#### 9.2. Other information

Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

#### SECTION 10: Stability and reactivity

##### 10.1. Reactivity

Unreactive under normal conditions.

##### 10.2. Chemical stability

Stable under normal conditions.

##### 10.3. Possibility of hazardous reactions

None.

##### 10.4. Conditions to avoid

Heat.

##### 10.5. Incompatible materials

Moisture. Oxidising agents. May react violently with alkaline-earth and alkali metals.

##### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition:  
Carbonyl fluoride, Hydrogen fluoride, Carbon monoxide.

#### SECTION 11: Toxicological information

##### 11.1. Information on toxicological effects

##### Acute oral toxicity

No data available.

##### Acute inhalation toxicity

Value: LC50

Species: Rat

Exposure time: 4 h

Value in non-standard unit: 457000 ppm

Irregular cardiac activity., Narcosis.

##### Acute dermal toxicity

No data available.

##### Acute toxicity other routes

Ingestion is not considered a potential route of exposure.

##### Skin irritation

No data available.

##### Eye irritation

No data available.

##### Sensitization

Test type: Cardiac sensitisation threshold limit. 932 761 mg<sup>3</sup>

##### Repeated dose toxicity

No data available.

##### Genetic toxicity in vitro

Test type: Ames test in vitro:

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Inactive.

#### Assessment mutagenicity

There is no evidence of mutagenic potential.

#### Assessment carcinogenicity

No evidence of carcinogenic effects.

#### Assessment toxicity to reproduction

No data available.

#### Assessment teratogenicity

No data available.

#### Experiences with human exposure

Inhalation of vapours in high concentrations may cause shortness of breath (lung oedema).

Irregular cardiac activity.

Narcosis.

### SECTION 12: Ecological information

#### 12.1. Toxicity

When discharged in large quantities may contribute to the greenhouse effect.

##### Acute and prolonged toxicity fish

Species: Zebra fish (Danio rerio)

Exposure time: 96 h

Value type: LC50

Value in standard unit mg/l: 292 mg/l

##### Acute toxicity aquatic invertebrates

Species: Daphnia magna

Exposure time: 48 h

Value type: EC50

Value in standard unit mg/l: 299 mg/l

##### Toxicity aquatic plants

Species: Algae

Exposure time: 96 h

Value type: ErC50

Value in standard unit mg/l: > 186 mg/l

#### 12.2. Persistence and degradability

##### Biodegradation

Biodegradation: 16 %

Exposure time: 28 d

Not readily biodegradable.

#### 12.3. Bioaccumulative potential

No data available.

#### 12.4. Mobility in soil

No data available.

#### 12.5. Results of PBT and vPvB assessment

No data available.

#### 12.6. Other adverse effects

##### Global Warming Potential GWP

Contains fluorinated greenhouse gases covered by the Kyoto protocol.

9.400

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. Avoid discharge to atmosphere.

EWC Nr. 16 05 05

### SECTION 14: Transport information

#### ADR/RID

##### 14.1. UN number

3163

##### 14.2. UN proper shipping name

Liquefied gas, n.o.s. (1,1,1,3,3,3-Hexafluoropropane)

##### 14.3. Transport hazard class(es)

Class: 2

Classification Code: 2A

Labels: 2.2

Hazard number: 20

Tunnel restriction code: (C/E)

Emergency Action Code: 2TE

##### 14.4. Packing group (Packing Instruction)

P200

##### 14.5. Environmental hazards

None.

##### 14.6. Special precautions for user

None.

#### IMDG

##### 14.1. UN number

3163

##### 14.2. UN proper shipping name

Liquefied gas, n.o.s. (1,1,1,3,3,3-Hexafluoropropane)

##### 14.3. Transport hazard class(es)

Class: 2.2

Labels: 2.2

EmS: F-C,S-V

##### 14.4. Packing group (Packing Instruction)

P200

##### 14.5. Environmental hazards

None.

##### 14.6. Special precautions for user

None.

##### 14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

#### IATA

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**14.1. UN number**  
3163

**14.2. UN proper shipping name**  
Liquefied gas, n.o.s. (1,1,1,3,3,3-Hexafluoropropane)

**14.3. Transport hazard class(es)**  
Class: 2.2  
Labels: 2.2

**14.4. Packing group (Packing Instruction)**  
P200

**14.5. Environmental hazards**  
None.

**14.6. Special precautions for user**  
None.

**Other transport information**

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the cylinder valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations.

**SECTION 15: Regulatory information**

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**  
Seveso Directive 96/82/EC: Not covered.

**15.2. Chemical safety assessment**  
A CSA does not need to be carried out for this product.

**SECTION 16: Other information**

Ensure all national/local regulations are observed. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

**Advice**

Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted. Details given in this document are believed to be correct at the time of going to press.

**Further information**

**Note:**

When using this document care should be taken, as the decimal sign and its position complies with rules for the structure and drafting of international standards, and is a comma on the line.

As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

**End of document**