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

1.1. Product identifier
Product name
1,1,1,3,3-Pentafluoropropane (R 245fa)
EC No (from EINECS): 419-170-6
CAS No: 460-73-1
Index-Nr.
Chemical formula CF3CH2CHF2
REACH Registration number: Not available.

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, Priestley Road, Worsley, Manchester M28 2UT
E-Mail Address ReachSDS@boc.com

1.4. Emergency telephone number
Emergency phone numbers (24h): 0800 111 333

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.

Not classified as hazardous to health.

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
  P281 Use personal protective equipment as required.
  P260 Do not breathe gas, vapours.
  Precautionary Statement Response
  IF exposed or concerned: Get medical advice/attention.
  Precautionary Statement Storage
  P410 + P403 Protect from sunlight. 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

3.1. Substances
1,1,1,3,3-Pentafluoropropane (R 245fa)
CAS No: 460-73-1
Index-Nr.: Not available.
EC No (from EINECS): 419-170-6
REACH Registration number: Not available.
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
Inhalation can cause damage to respiratory tract and lungs. May produce irregular heart beat and nervous symptoms. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.

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

SECTION 5: Fire fighting measures
Safety data sheet
1,1,1,3,3-Pentafluoropropane (R 245fa)

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. Can ignite spontaneously in air. Non flammable. Hazardous combustion products
If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Hydrogen fluoride. Carbon monoxide, Carbonyl fluoride.

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
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 protective valve discontinuity in 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. Absorb excess liquid spillage on inorganic absorbent material such as fine sand, brick dust etc. Place spent absorbent in sealed packages and contact specialist waste disposal contractor.

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 backpressure in 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 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 contaminates 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.

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
Exposure limit value
Value type  value  Note
WEEL (Workplace Environmental Exposure Limit)  300 ppm (AIHA)
DNEL not available
PNEC not available.

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. Product to be handled in a closed system. 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. Keep concentrations well below occupational exposure limits.

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 168 when using gases.
Skin protection
Hand protection
Advice: Chemically resistant gloves complying with EN 374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Material: Viton
Min. Breakthrough time: 480 min
Safety data sheet
1,1,1,3,3-Pentafluoropropane (R 245fa)

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Glove thickness:
0,7 mm
Guideline:
EN 374-1/2/3 Protective gloves against chemicals and micro-organisms.
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: No odour warning properties.
Odour threshold: Odour threshold is subjective and inadequate to warn for over
exposure.
Melting point: -103 °C
Boiling point: 15,3 °C
Flash point: Not applicable for gases and gas mixtures.
Flammability range: No reliable data available.
Vapour Pressure 20 °C: 1,227 bar
Relative density, gas: 4,6
Solubility in water: 130 mg/l
Partition coefficient: n-octanol/water: 1,35 logPow
Autoiginition temperature: 412 °C
Molecular weight: 134,03 g/mol

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
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:
Hydrogen fluoride. Carbon monoxide, Carbonyl fluoride

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute oral toxicity
Not applicable.
Acute inhalation toxicity
Value: LC50
Species: Rat
Exposure time: 4 h
Value: > 200,000 ppm
Value: LC50
Species: Mouse
Exposure time: 4 h
Value in non-standard unit: > 100,000 ppm
Acute dermal toxicity
Value: LD50
Species: Rabbit
Value: > 2,000 mg/kg

Acute toxicity other routes
Ingestion is not considered a potential route of exposure.
Skin irritation
No data available.
Eye irritation
No data available.

Sensitization
No data available.
Repeated dose toxicity
Species: Rat
NOAEL ppm: 500 ppm
Assessment mutagenicity
No data available.
Assessment carcinogenicity
No data available.
Assessment toxicity to reproduction
No data available.
Assessment teratogenicity
No data available.

Other relevant toxicity information
Inhalation can cause damage to respiratory tract and lungs.,
Causes damage to the cardiovascular system.
Experiences with human exposure
Irregular cardiac activity.

SECTION 12: Ecological information

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

Acute and prolonged toxicity fish
Species: Rainbow trout (Oncorhynchus mykiss)
Exposure time: 96 h
Value type: LC50
Value in standard unit mg/l: > 81,8 mg/l

Acute and prolonged toxicity fish
Species: Rainbow trout (Oncorhynchus mykiss)
Exposure time: 96 h
Value type: NOEC
Value in standard unit mg/l: > 10 mg/l

Acute toxicity aquatic invertebrates
Species: Daphnia magna
Exposure time: 48 h
Value type: EC50
Value in standard unit mg/l: 97,9 mg/l

Acute toxicity aquatic invertebrates
### Species: Daphnia magna
Exposure time: 48 h
Value in standard unit mg/l: > 97.9 mg/l

#### 12.2. Persistence and degradability
No data available.

#### 12.3. Bioaccumulative potential

**Bioaccumulation**
Accumulation in aquatic organisms is unlikely.

#### 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.

#### 13. Waste treatment methods
Avoid discharge to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. Gases in pressure containers excluding those, which are mentioned under 16 05 04.

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#### 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 –Pentafluoropropane R245fa)

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.

**IMDG**

14.1. UN number
3163

14.2. UN proper shipping name
Liquefied gas, n.o.s. (1,1,1,3,3 –Pentafluoropropane R245fa)

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 adequate ventilation. Ensure compliance with applicable regulations.

#### 15. Regulatory information

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

Other regulations
Regulation on Fluorinated greenhouse gases 842/2006/EC: Listed.

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

#### 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**