# Safety data sheet
# 1,1,1,3,3-Pentafluoropropane (R 245fa)



**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.

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

| | |
|---|---|
| P308 + P313 | 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**

**Substance / Mixture**: Substance.

**3.1. Substances**
1,1,1,3,3-Pentafluoropropane (R 245fa)
**CAS No:** 460-73-1
**Index-Nr.**:
**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**

**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 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. Absorb excess liquid spillage on inorganic adsorbent material such as fine sand, brick dust etc. Place spent adsorbent 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 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 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 166 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

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
**Autoignition 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 type: NOEC
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.
950

## SECTION 13: Disposal considerations

**13.1. 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.
**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 –Pentafluoropropane R245fa)

**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 –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.

**14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**
Not applicable.

**IATA**

**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 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.

**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.

## 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**