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

1.1. Product identifier
Product name
Chlorodifluoromethane (R 22)

EC No (from EINECS): 200-871-9
CAS No: 75-45-6

Index-Nr.
Chemical formula: CHClF2

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.
Ozone - Hazardous to the ozone layer.

N; R59
Asphyxiant in high concentrations. Dangerous for the ozone layer.

Risk advice to man and the environment
Liquefied gas. Contact with liquid may cause cold burns/frost bite.

2.2. Label elements
- Labelling Pictograms

- Signal word
Danger

- Hazard Statements
H280 Contains gas under pressure; may explode if heated.
EUH059 Hazardous to the ozone layer.
EIGA-As Asphyxiant in high concentrations.

- Precautionary Statements
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
Chlorodifluoromethane (R 22)
CAS No: 75-45-6

Index-Nr.
EC No (from EINECS): 200-871-9
REACH Registration number: Not available.
Contain 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 narcotic effects. Symptoms may include dizziness, headache, nausea and loss of coordination.

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:
Carbon monoxide, Phosgene, Hydrogen chloride, Hydrogen fluoride, 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.

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. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. 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. Containers should not be stored in conditions likely to encourage corrosion. 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.

7.3. Specific end use(s)
None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
Exposure limit value
<table>
<thead>
<tr>
<th>Value type</th>
<th>value</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILV</td>
<td>1,000 ppm</td>
<td>(EU)</td>
</tr>
<tr>
<td>Great Britain - LTEL</td>
<td>1,000 ppm</td>
<td>EH 40/07</td>
</tr>
<tr>
<td>PNEC not available.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNEL not available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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. Keep concentrations well below occupational exposure limits. 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

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 Poor warning properties at low concentrations.
Odour threshold: Odour threshold is subjective and inadequate to warn for over exposure.
Melting point: -157 °C
Boiling point: -40,9 °C
Flash point: Not applicable for gases and gas mixtures.
Evaporation rate: Not applicable for gases and gas mixtures.
Flammability range: Non flammable.
Vapour Pressure 20 °C: 9,1 bar
Relative density, gas: 3
Solubility in water: 3628 mg/l
Partition coefficient: n-octanol/water: 1,08 logPow
Autoignition temperature: Not applicable.

Explosive properties:
Explosive acc. EU legislation: Not explosive.
Explosive acc. transp. reg.: Not explosive.
Molecular weight: 86,5 g/mol
Critical temperature: 96,2 °C
Relative density, liquid: 1,2

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. May react violently with alkaline-earth and alkali metals. For material compatibility see latest version of ISO-11114.

10.6. Hazardous decomposition products
Under normal conditions of storage and use, hazardous decomposition products should not be produced. The following decomposition products may be produced:
Carbon monoxide, Phosgene, Hydrogen chloride, Hydrogen fluoride, Carbonyl fluoride.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
General
May produce irregular heart beat and nervous symptoms.

Acute inhalation toxicity
Value: LC50
Species: Rat
Exposure time: 4 h
Value in standard unit mg/l: 778 mg/l

Value: LC50
Species: Rat
Exposure time: 0,25 h
Value in standard unit mg/l: 1.237 mg/l

Value: LC50
Species: Mouse
Exposure time: 0,5 h
Value in standard unit mg/l: 990 mg/l

Acute dermal toxicity
No known effects from this product.

Acute toxicity other routes
No known effects from this product.

Skin irritation
No known effects from this product.

Eye irritation
No known effects from this product.

Sensitization
No known effects from this product.

Repeated dose toxicity
No known effects from this product.

Assessment mutagenicity
No known effects from this product.

Assessment carcinogenicity
No known effects from this product.

Assessment toxicity to reproduction
No known effects from this product.

Assessment teratogenicity
No known effects from this product.

Experiences with human exposure
Inhalation of vapours in high concentrations may cause shortness of breath (lung oedema).

Narcosis.

Irregular cardiac activity.

SECTION 12: Ecological information

12.1. Toxicity

Acute and prolonged toxicity fish
Species: Zebra fish (Danio rerio)
Exposure time: 96 h
Value type: LC50
Value in standard unit mg/l: 777 mg/l

Acute and prolonged toxicity fish
Species: Daphnia magna
Exposure time: 48 h
Value type: EC50
Value in standard unit mg/l: 433 mg/l

12.2. Persistence and degradability
No data available.

Biodegradation
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
When discharged in large quantities may contribute to the greenhouse effect.
1.810
Ozone Depleting Potential ODP
Covered by the 'Montreal Protocol'. Hazardous to the ozone layer.
0.055

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Must not be discharged to atmosphere. Consult supplier for specific recommendations. Gases in pressure containers (including halons) containing dangerous substances
EWC Nr. 16 05 04*

SECTION 14: Transport information

14.1. UN number
1018

14.2. UN proper shipping name
CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)

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.

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
Use of the substance may be subject to registration and authorisation (Regulation on substances that deplete the Ozone Layer(EC) No 1005/2009.)

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).

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