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

1.1 Product identifier
   Trade name
   R508b

1.2 Relevant identified uses of the substance or mixture and uses advised against
   Relevant identified uses of the substance or mixture
   Refrigerant for professional use in ultra-low temperature freezers
   Uses advised against
   No data available.

1.3 Details of the supplier of the safety data sheet
   Address
   Eppendorf AG
   Barkhausenweg 1
   D-22339 Hamburg
   Telephone no. +49 40 53801-0
   Information provided by / telephone
   Eppendorf Application-Hotline
   Tel.: +49 1803 66 67 89
   Fax: +49 4053 99 01 25
   email: support@eppendorf.com
   Advice on Safety Data Sheet
   sdb_info@umco.de

1.4 Emergency telephone number
   For medical advice (in German and English):
   +49 (0)551 192 40 (Giftinformationszentrum Nord)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
   Classification in accordance with Regulation (EC) No 1272/2008 (CLP)
   Press. Gas liq.; H280
   Classification information
   This product is assessed and classified using the methods and criteria below referred to in Article 9 of Regulation (EC) n° 1272/2008:
   Physical hazards: determined through assessment data based on the methods or standards referred to in part 2 of Annex I to CLP
   Health hazards and environmental hazards: determined through toxicological and ecotoxicological assessment data based on the methods or standards referred to in Part 3, 4 and 5 of Annex I to CLP.

2.2 Label elements
   Labelling according to Regulation (EC) No 1272/2008 (CLP Regulation)
   Hazard pictograms
   GHS04
   Signal word
   Warning
   Hazard statements
   H280 Contains gas under pressure; may explode if heated.
Precautionary statements
P403 Store in a well-ventilated place.

Supplemental label elements
Contains fluorinated greenhouse gases covered by the Kyoto protocol.

2.3 Other hazards
Liquefied gas: Spilled liquid can cause cold burns. This gas is heavier than air and may accumulate in low areas.

SECTION 3: Composition/information on ingredients

3.1 Substances
Not applicable. The product is not a substance.

3.2 Mixtures
Chemical characterization
Pressurised liquified gas

Hazardous ingredients

<table>
<thead>
<tr>
<th>No</th>
<th>Substance name</th>
<th>CAS / EC / Index / REACH no</th>
<th>Classification (EC) 1272/2008 (CLP)</th>
<th>Concentration</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>trifluoromethane</td>
<td>75-46-7 200-872-4</td>
<td>Press. Gas liq.; H280</td>
<td>&gt;= 60.00 - &lt; 70.00</td>
<td>Vol%</td>
</tr>
<tr>
<td>2</td>
<td>perfluoroethane</td>
<td>76-16-4 200-999-8</td>
<td>Press. Gas liq.; H280</td>
<td>&gt;= 30.00 - &lt; 40.00</td>
<td>Vol%</td>
</tr>
</tbody>
</table>

Full Text for all H-phrases and EUH-phrases: pls. see section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
Remove contaminated clothing and shoes immediately, and launder thoroughly before reusing. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.

After inhalation
Ensure supply of fresh air. Remove affected person from the immediate area. Irregular breathing/no breathing: artificial respiration. Take medical treatment.

After skin contact
In case of cold burns after contact with liquefied gas: rinse with plenty of warm water (40°C approx.). If clothing is burnt onto the wound DO NOT pull off. Seek medical attention.

After eye contact
Remove contact lenses. Rinse eye thoroughly under running water keeping eyelids wide open and protecting the unaffected eye (at least 10 to 15 minutes). Get immediate ophthalmic treatment.

After ingestion
Do not induce vomiting. Call a doctor. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms
respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

4.3 Indication of any immediate medical attention and special treatment needed
No data available.
SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Product itself is non-combustible; adapt fire extinguishing measures to surrounding areas.

Unsuitable extinguishing media
No data available.

5.2 Special hazards arising from the substance or mixture

In case of fire: danger of pressure build up, which could result in container rupture. In the event of fire, the following can be released: Carbon monoxide and carbon dioxide; Hydrogen fluoride (HF); Carbonyl fluoride; Fluorinated hydrocarbons; 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.

5.3 Advice for firefighters

Use self-contained breathing apparatus. Cool endangered containers with water spray jet. Wear protective clothing.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Refer to protective measures listed in sections 7 and 8. Ensure adequate ventilation. Keep away sources of ignition.

For emergency responders
No data available. Personal protective equipment (PPE) - see Section 8.

6.2 Environmental precautions

Do not discharge into the drains/surface waters/groundwater. Do not discharge into the subsoil/soil.

6.3 Methods and material for containment and cleaning up

Ventilate room.

6.4 Reference to other sections

Information regarding personal protective measures, see chapter 8. Information regarding waste disposal, see chapter 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Provide good ventilation at the work area (local exhaust ventilation, if necessary). If workplace exposure limits are exceeded, respiratory protection approved for this particular job must be worn. Product inherent handling risks must be minimised taking the appropriate measures for protection and preventive actions. The working process should be designed to rule out the release of hazardous substances or skin contact as far it is possible by the state of the art.

General protective and hygiene measures
Do not eat, drink or smoke during work time. Keep away from foodstuffs and beverages. Avoid contact with eyes and skin. Remove soiled or soaked clothing immediately. Do not inhale vapours. Wash hands before breaks and after work. Provide eye wash fountain in work area. Have emergency shower available.

Advice on protection against fire and explosion
Isolate from sources of heat, sparks and open flame.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Keep container tightly closed and dry in a cool, well-ventilated place. Store upright.

Requirements for storage rooms and vessels
Containers which are opened must be carefully closed and kept upright to prevent leakage. Always keep in containers of same material as the original one.

Advice on storage assembly
Do not store together with: Acids; Oxidizing agents; Magnesium; Zinc; Calcium; Aluminium powder; Alcali metals; Earth alkali metals.
7.3 Specific end use(s)
No data available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
No parameters available for monitoring.

8.2 Exposure controls

Appropriate engineering controls
Ensure adequate ventilation, local exhaust at the work station if necessary.

Personal protective equipment

Respiratory protection
If workplace exposure limits are exceeded, a respiration protection approved for this particular job must be worn. In case of aerosol and mist formation, take appropriate measures for breathing protection in the event workplace threshold values are not specified.

Eye / face protection
Safety glasses (EN 166)

Hand protection
Sufficient protection is given wearing suitable protective gloves checked according to i.e. EN 374, in the event of risk of skin contact with the product. Before use, the protective gloves should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and antistatic properties). Adhere to the manufacturer’s instructions and information relating to the use, storage, care and replacement of protective gloves. Protective gloves shall be replaced immediately when physically damaged or worn. Design operations thus to avoid permanent use of protective gloves.

Other
Normal chemical work clothing.

Environmental exposure controls
No data available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form/Colour</td>
<td>liquified gas, colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>sweetish</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH value</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>-88.3 °C</td>
</tr>
<tr>
<td>Melting point / melting range</td>
<td>No data available</td>
</tr>
<tr>
<td>Sublimation point / sublimation range</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Decomposition point / decomposition range</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
### Auto-ignition temperature
- Not applicable

### Oxidising properties
- Not applicable

### Explosive properties
- Not applicable

### Flammability (solid, gas)
- The product is not combustible.

### Lower flammability or explosive limits
- No data available

### Upper flammability or explosive limits
- No data available

### Vapour pressure
- No data available

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Reference temperature</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapour density</td>
<td>3.33</td>
<td>15 °C</td>
<td>Air = 1</td>
</tr>
</tbody>
</table>

### Evaporation rate
- No data available

### Relative density
- No data available

### Density
- No data available

### Solubility in water
- No data available

### Solubility(ies)
- No data available

### Partition coefficient: n-octanol/water
- No data available

### Viscosity
- No data available

### 9.2 Other information
- No data available.

### SECTION 10: Stability and reactivity

#### 10.1 Reactivity
- No data available.

#### 10.2 Chemical stability
- Stable under recommended storage and handling conditions (See section 7).

#### 10.3 Possibility of hazardous reactions
- Dangerous reactions are not to be expected when handling product according to its intended use.

#### 10.4 Conditions to avoid
- Heat, naked flames or other ignition sources, electrostatic charge and discharge, formation of vapours/aerosols.

#### 10.5 Incompatible materials
- Aluminium powder; calcium; Zinc; Magnesium; Oxidizing agents; Alkali metals; Earth alkali metals
### 10.6 Hazardous decomposition products
Fluorinated hydrocarbons

### SECTION 11: Toxicological information

#### 11.1 Information on toxicological effects

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>No</th>
<th>Product Name</th>
<th>Evaluation/classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
<tr>
<td>Acute dermal toxicity</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
<tr>
<td>Acute inhalational toxicity</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
<tr>
<td>Respiratory or skin sensitisation</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
<tr>
<td>Reproduction toxicity</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
</tbody>
</table>

### STOT—single exposure

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>No</th>
<th>Product Name</th>
<th>Evaluation/classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOT—single exposure</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
</tbody>
</table>

### STOT—repeated exposure

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>No</th>
<th>Product Name</th>
<th>Evaluation/classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOT—repeated exposure</td>
<td></td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
</tbody>
</table>
Aspiration hazard
Based on available data, the classification criteria are not met.

Delayed and immediate effects as well as chronic effects from short and long-term exposure
Product specific toxicological data are not available.

section 12: Ecological information

12.1 Toxicity

<table>
<thead>
<tr>
<th>Toxicity to fish (acute)</th>
<th>No</th>
<th>Product Name</th>
<th>Evaluation/classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
</tbody>
</table>

| Toxicity to fish (chronic) | No data available |

<table>
<thead>
<tr>
<th>Toxicity to Daphnia (acute)</th>
<th>No</th>
<th>Product Name</th>
<th>Evaluation/classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
</tbody>
</table>

| Toxicity to Daphnia (chronic) | No data available |

<table>
<thead>
<tr>
<th>Toxicity to algae (acute)</th>
<th>No</th>
<th>Product Name</th>
<th>Evaluation/classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>R508b</td>
<td>Based on available data, the classification criteria are not met.</td>
</tr>
</tbody>
</table>

| Toxicity to algae (chronic) | No data available |

| Bacteria toxicity | No data available |

12.2 Persistence and degradability

<table>
<thead>
<tr>
<th>Biodegradability</th>
<th>No</th>
<th>Product Name</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>R508b</td>
<td>The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physico-chemical eliminability</th>
<th>No</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>R508b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

12.3 Bioaccumulative potential
No data available.

12.4 Mobility in soil

<table>
<thead>
<tr>
<th>Mobility in soil</th>
<th>No</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>R508b</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td>Because of its high volatility, the product is unlikely to cause ground or water pollution.</td>
</tr>
</tbody>
</table>
12.5 Results of PBT and vPvB assessment
No data available.

12.6 Other adverse effects
No data available.

12.7 Other information

<table>
<thead>
<tr>
<th>Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not discharge product unmonitored into the environment.</td>
</tr>
</tbody>
</table>

SECTION 13: Disposal considerations

13.1 Waste treatment methods

<table>
<thead>
<tr>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste code 14 06 01* chlorofluorocarbons, HCFC, HFC</td>
</tr>
</tbody>
</table>

The listed waste code numbers, according to the European Waste Catalogue, are to be understood as a recommendation. A final decision must be made in agreement with the regional waste disposal company. Refer to the EIGA code of practice (Doc.30 "Disposal of Gases"; http://www.eiga.org). Dispose of in accordance with local regulation.

<table>
<thead>
<tr>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse. Packaging that cannot be cleaned should be disposed of in agreement with the regional waste disposal company.</td>
</tr>
</tbody>
</table>

SECTION 14: Transport information

14.1 Transport ADR/RID/ADN

<table>
<thead>
<tr>
<th>Class</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>2A</td>
</tr>
<tr>
<td>Hazard identification no.</td>
<td>20</td>
</tr>
<tr>
<td>UN number</td>
<td>UN3163</td>
</tr>
<tr>
<td>Technical name</td>
<td>LIQUEFIED GAS, N.O.S.</td>
</tr>
<tr>
<td>Danger releasing substance</td>
<td>trifluoromethane, perfluoroethane</td>
</tr>
<tr>
<td>Tunnel restriction code</td>
<td>C/E</td>
</tr>
<tr>
<td>Label</td>
<td>2.2</td>
</tr>
</tbody>
</table>

14.2 Transport IMDG

<table>
<thead>
<tr>
<th>Class</th>
<th>2.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>UN3163</td>
</tr>
<tr>
<td>Proper shipping name</td>
<td>LIQUEFIED GAS, N.O.S.</td>
</tr>
<tr>
<td>Danger releasing substance</td>
<td>trifluoromethane, perfluoroethane</td>
</tr>
<tr>
<td>EmS</td>
<td>F-C+S-V</td>
</tr>
<tr>
<td>Label</td>
<td>2.2</td>
</tr>
</tbody>
</table>

14.3 Transport ICAO-TI / IATA

<table>
<thead>
<tr>
<th>Class</th>
<th>2.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN number</td>
<td>UN3163</td>
</tr>
<tr>
<td>Proper shipping name</td>
<td>Liquefied gas, n.o.s.</td>
</tr>
<tr>
<td>Danger releasing substance</td>
<td>trifluoromethane, perfluoroethane</td>
</tr>
<tr>
<td>Label</td>
<td>2.2</td>
</tr>
</tbody>
</table>

14.4 Other 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 container valve is closed and not leaking. Container valve guards or caps should be in place.
14.5 Environmental hazards
Information on environmental hazards, if relevant, please see 14.1 - 14.3.

14.6 Special precautions for user
No data available.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code
Not relevant

SECTION 15: Regulatory information

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

EU regulations

Regulation (EC) No 1907/2006 (REACH) Annex XIV (List of substances subject to authorisation)
According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substances considered as substances requiring authorisation as listed on Annex XIV of the REACH regulation (EC) 1907/2006.

REACH candidate list of substances of very high concern (SVHC) for authorisation
According to available data and the information provided by preliminary suppliers, the product does not contain substances that are considered substances meeting the criteria for inclusion in annex XIV (List of Substances Subject to Authorisation) as laid down in Article 57 and article 59 of REACH (EC) 1907/2006.

According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substances requiring authorisation as listed on Annex XIV of the REACH regulation (EC) 1907/2006.

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances
This product is not subject to Part 1 or 2 of Annex I.

Other regulations
Adhere to the national sanitary and occupational safety regulations when using this product.

15.2 Chemical safety assessment
For this mixture a chemical safety assessment has not been carried out.

SECTION 16: Other information

Sources of key data used to compile the data sheet:
National Threshold Limit Values of the corresponding countries as amended in each case.
Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.
The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding chapter.

Department issuing safety data sheet
UMCO Umwelt Consult GmbH
Georg-Wilhelm-Str. 183, D-21107 Hamburg
Tel.: +49 40 / 79 02 36 300 Fax: +49 40 / 79 02 36 357 e-mail: umco@umco.de

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

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