GPS Safety Summary

Substance Name:

Pentafluoroethane

1. General Statement

Pentafluoroethane (Forane® 125) is a non-flammable HFC gas (HydroFluoroCarbon substance) used for refrigeration and as a fire extinguishing agent.

2. Chemical Identity

Name: HFC-125; R-125; Pentafluoroethane
Brand names: Forane® 125
Chemical name (IUPAC): Pentafluoroethane
CAS number: 354-33-6
EC number: 206-557-8
Molecular formula: C₂HF₅
Structure:

3. Use and applications

Pentafluoroethane is a component of blends used for refrigeration in closed systems. It can be found in commercial refrigeration, food processing & cold storage, transport refrigeration, commercial or domestic air conditioning, air cooled chillers or water cooled chillers used in building and large systems for air conditioning. It is also used as a fire extinguishing agent.

Pentafluoroethane itself is not sold to consumers.

4. Physical / Chemical properties

Pentafluoroethane is non-hazardous gas with the following physicochemical properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Gas at 20°C and 1013 hPa</td>
</tr>
<tr>
<td>Form</td>
<td>Liquefied gas (under pressure)</td>
</tr>
<tr>
<td>Colour</td>
<td>Colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>Slightly ether-like</td>
</tr>
</tbody>
</table>
### 5. Health Effects

Pentafluoroethane is poorly absorbed and is nearly completely excreted unchanged via exhaled air. Pentafluoroethane is non-toxic.

<table>
<thead>
<tr>
<th>Effect Assessment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Toxicity</td>
<td>Very low acute toxicity by inhalation. High concentrations may cause headache, dizziness or drowsiness. Dermal and oral: not relevant for a gas.</td>
</tr>
<tr>
<td>Oral / inhalation / dermal</td>
<td></td>
</tr>
<tr>
<td>Irritation / corrosion</td>
<td>No signs of respiratory tract irritation observed in animals exposed by inhalation on an acute or repeated basis. Skin and eye: frostbite can result from contact with the liquefied form.</td>
</tr>
<tr>
<td>Skin / eye / respiratory tract</td>
<td></td>
</tr>
<tr>
<td>Sensitisation</td>
<td>A cardiac sensitisation potential was noted in dogs at high concentrations. Inhalation: no data. Dermal: not relevant for a gas.</td>
</tr>
<tr>
<td>Toxicity after repeated exposure</td>
<td>Inhalation: no relevant toxic effects noted in animals exposed for up to 3 months. Dermal and oral: not relevant for a gas.</td>
</tr>
<tr>
<td>Oral / inhalation / dermal</td>
<td></td>
</tr>
<tr>
<td>Genotoxicity / Mutagenicity</td>
<td>Not expected to cause genetic effects based on available test data, <em>in vitro</em> and in animals.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>No concern for carcinogenicity in the absence of relevant subchronic toxicity and of genotoxic properties.</td>
</tr>
<tr>
<td>Reproductive / Developmental Toxicity</td>
<td>A related substance did not impact fertility in animals. Pentafluoroethane had no effects on <em>in utero</em> development and health of mother and fetus in animals.</td>
</tr>
</tbody>
</table>

### 6. Environmental Effects

No experimental data are available on this substance. When tested in closed systems, several related fluorocarbons were not acutely toxic to fish, aquatic invertebrates and algae. As it is a gas, any emitted Pentafluoroethane will quickly partition to the atmosphere, where it takes decades to photolyse. It will not partition significantly to soil or sediment due to its estimated moderate adsorption coefficient (log $K_{oc}$ of 1.3). It is not expected to bioaccumulate in the food chain based on its low lipophilicity (log $K_{ow} = 1.48$).

Pentafluoroethane is a greenhouse gas, *i.e.*, it contributes to global warming. It is not ozone-depleting.
### Effect Assessment | Result
--- | ---
Aquatic Toxicity | Acute: not toxic (for similar substances)  
Chronic: no data

### Fate and behaviour | Result
--- | ---
Degradation/Persistence | Poorly degradable in water and air. Does not persist in water/soil/sediment as quickly partitioned to atmosphere
Bioaccumulation potential | Not expected to bioaccumulate significantly
PBT / vPvB conclusion | Not considered to be PBT* or vPvB**

*: Persistent, Bioaccumulative and Toxic (PBT)  
**: very Persistent and very Bioaccumulative (vPvB)

7. **Exposure**

#### 7.1 Human health

In accordance with the REACH Regulation, no exposure scenario is required in the absence of classification for human health.

**Consumers:**

Consumers may be briefly exposed to Pentafluoroethane and its combustion products when used to extinguish fires.

For all other uses, consumers are not directly exposed to Pentafluoroethane since they are not supposed to open closed receptacles of refrigeration/air conditioning equipment.

In view of its main use in closed systems, its absence of bioaccumulation and its volatility, indirect exposure to Pentafluoroethane via the environment is negligible.

**Workers:**

Pentafluoroethane is industrially manufactured and used (including formulation) in closed systems in a continuous or batch process, minimizing the occupational exposure potential. The final use consists in inclusion in closed receptacles in refrigeration/air conditioning equipment. Workers may be exposed during cleaning, maintenance, transfer, sampling and analysis.

Professionals installing, servicing and maintaining equipment containing Pentafluoroethane in closed systems may also be exposed to small amounts. They are specialised personnel meeting specific qualifications and trained to avoid exposure.

Workers may be briefly exposed to Pentafluoroethane and its combustion products when used to extinguish fires.

Procedures, controls, collective and personal risk management measures are in place, which limit the occupational exposure during the manufacture and use of the substance. Workers who might accidentally come into contact with the substance should follow the safety measures recommended in the Safety Data Sheet.

Risks are controlled when activities are carried out under conditions recommended in the Safety Data Sheet (see Chap. 8).

#### 7.2 Environment

In accordance with the REACH Regulation, no exposure scenario is required in the absence of classification for the environment.

Industrial manufacture and use (including formulation) takes place in closed systems in a continuous or batch process, minimizing release to the atmosphere.
Professional work on equipment containing Pentafluoroethane, or use as a fire extinguishing agent, may involve a release to the atmosphere. Due to its physicochemical properties (see section 6), any emitted Pentafluoroethane will stay in the atmosphere.

In accordance with EU Regulation EC 842/2006 on certain fluorinated greenhouse gases, procedures, controls and risk management measures are in place, which strictly limit the environmental exposure and specifically the emissions to the atmosphere.

8. Risk Management recommendations

In accordance with the REACH Regulation, no risk assessment is required in the absence of classification for human health and the environment.

<table>
<thead>
<tr>
<th>Human health measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational</strong></td>
</tr>
<tr>
<td><strong>Engineering controls</strong></td>
</tr>
</tbody>
</table>
| **Protection**         | **Eye/Face protection:** Safety glasses with side-shields  
                        | **Skin protection:** Protective clothing (cotton)  
                        | **Hand protection:** Leather gloves  
                        | **Respiratory protection:** Respirator if ventilation is insufficient |
| **Environment protective measures** | Do not release into the environment. |

9. Regulatory Information / Classification and Labelling

9.1 Regulatory Information

This substance has notably been addressed in the following European Regulations:

- EU Regulation EC 1907/2006 (REACH): the substance has been registered
- EU Regulation EC 842/2006 on certain fluorinated greenhouse gases: the substance is listed under the name HFC-125.
- OECD SIDS (Screening Information Data Set) program

9.2 Classification and labelling

Under GHS, substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according to CLP (EC) 1272/2008, implementation of the GHS in the European Union.
Classification
Gases under pressure: Category Liquefied Gas

Signal word
Warning

Pictogram
GHS04: Gas cylinder

Hazard statement
H280: Contains gas under pressure; may explode if heated.

Additional classification according to Globally Harmonized System (GHS)
None

10. Contact Information within Company

For further information on this substance or product safety summary in general, please contact:

- ICCA portal where the GPS Safety Summary is posted:

11. Date of Issues / Revision

- Date of issue: 2013/04/15
- Date of revision:

12. Disclaimer

The information contained in this paper is intended as advice only and whilst the information is provided in utmost good faith and has been based on the best information currently available, is to be relied upon at the user’s own risk.

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