

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

Sid Harvey item #'s R245FAX30 & R245FAX100

SDS # Z0513

HFC-245fa, Genetron® 245fa

Version 5.2

Revision Date 26.11.2015

Supersedes 4

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

1.1. Product identifier

Product name : HFC-245fa, Genetron® 245fa
SDS-number : 000000009878
Type of product : Substance
Remarks : SDS according to Art. 31 of Regulation (EC) 1907/2006.
Chemical Name : 1,1,1,3,3-Pentafluoropropane
CAS-No. : 460-73-1
Registration number : 01-0000016587-60

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the : Refrigerant
Substance/Mixture : Heat transfer fluid
Uses advised against : none

1.3. Details of the supplier of the safety data sheet

Company : Honeywell Fluorine Products Europe B.V.
Laarderhoogtweg 18
1101 EA Amsterdam
Netherlands
Telephone : (31) 020 5656911
Telefax : (31) 020 5656600
For further information, : PMTEU Product Stewardship:
please contact: SafetyDataSheet@Honeywell.com
Honeywell International, Inc.
115 Tabor Road
Morris Plains, NJ 07950-2546
USA

1.4. Emergency telephone number

Emergency telephone : (32) 16 391 209 (Mon-Fri, 9.00-17.00h) +1-703-527-
number 3887 (ChemTrec)
+1-303-389-1414 (Medical)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Gases under pressure Liquefied gas
H280 Contains gas under pressure; may explode if heated.

2.2. Label elements

REGULATION (EC) No 1272/2008

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Hazard pictograms

:



Signal word

:

Warning

Hazard statements

:

H280

Contains gas under pressure; may explode if heated.

Precautionary statements

:

P260

Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P280

Wear protective gloves/ eye protection/ face protection.

P284

In case of inadequate ventilation wear respiratory protection.

P308 + P313

IF exposed or concerned: Get medical advice/ attention.

P410 + P403

Protect from sunlight. Store in a well-ventilated place.

2.3. Other hazards

High vapour concentrations can cause headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness. May cause cardiac arrhythmia.

SECTION 3: Composition/information on ingredients

3.1. Substance

| Chemical Name | CAS-No. Index-No. Registration number EC-No. | Classification 1272/2008 | Concentration | Remarks |
|---|--|-----------------------------|---------------|---------|
| 1,1,1,3,3-Pentafluoropropane (Active ingredient) | 460-73-1 01-0000016587-60 419-170-6 | Press. Gas ; H280 | 99,8 | 1* |

1* - For specific concentration limits see Annexes of 1272/2008

3.2. Mixture

Not applicable

Occupational Exposure Limit(s), if available, are listed in Section 8.

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures**4.1 Description of first aid measures***Inhalation:*

Remove to fresh air. Artificial respiration and/or oxygen may be necessary. Call a physician immediately.

Skin contact:

After contact with skin, wash immediately with plenty of water. If skin irritation persists, call a physician.

Eye contact:

Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a specialist.

Ingestion:

As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician immediately.

4.2. Most important symptoms and effects, both acute and delayed

no data available

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

Do not give adrenaline or similar drugs.

See Section 11 for more detailed information on health effects and symptoms.

SECTION 5: Firefighting measures**5.1. Extinguishing media***Suitable extinguishing media:*

The product is not flammable.

ASHRAE 34

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Extinguishing media which shall not be used for safety reasons:

High volume water jet

5.2. Special hazards arising from the substance or mixture

Possibility of generating hazardous reactions during a fire due to the presence of F and Cl groups.

Heating will cause pressure rise with risk of bursting

Cool closed containers exposed to fire with water spray.

This product is not flammable at ambient temperatures and atmospheric pressure.

However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.

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5.3. Advice for firefighters

Wear full protective clothing and self-contained breathing apparatus.

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Immediately contact emergency personnel. Wear personal protective equipment. Unprotected persons must be kept away. Ensure adequate ventilation. In case of insufficient ventilation wear suitable respiratory equipment.

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. The product evaporates readily.

6.3. Methods and materials for containment and cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4. Reference to other sections

For personal protection see section 8.

SECTION 7: Handling and storage**7.1. Precautions for safe handling***Advice on safe handling:*

Open drum carefully as content may be under pressure. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material. Do not use in areas without adequate ventilation. Contaminated equipment (brushes, rags) must be cleaned immediately with water.

Advice on protection against fire and explosion:

Normal measures for preventive fire protection. Can form a combustible mixture with air at pressures above atmospheric pressure. Keep product and empty container away from heat and sources of ignition.

Hygiene measures:

Wash hands before breaks and immediately after handling the product. Avoid contact with skin, eyes and clothing.

7.2. Conditions for safe storage, including any incompatibilities

Further information on storage conditions:

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Store in original container. Keep away from direct sunlight. Keep containers tightly closed in a cool, well-ventilated place.

7.3. Specific end use(s)

Specific use information:

Restricted to professional users.

For industrial use only.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits:

| Components | Basis / Value type | Value / Form of exposure | Exceeding Factor | Remarks |
|------------------------------|-----------------------|------------------------------------|---------------------|--|
| 1,1,1,3,3-Pentafluoropropane | WEEL TWA | 1.644 mg/m ³ 300 ppm | | We are not aware of any national exposure limit. |

TWA - Time weighted average

DNEL/ PNEC-Values

No DNEL-data available.

No PNEC data available.

8.2. Exposure controls

Occupational exposure controls

The Personal Protective Equipment must be in accordance with EN standards: respirator EN 136, 140, 149; safety glasses EN 166; protective suit: EN 340, 463, 468, 943-1, 943-2; gloves EN 374, safety shoes EN-ISO 20345.

Personal protective equipment

Respiratory protection:

In case of insufficient ventilation wear suitable respiratory equipment.

Self-contained breathing apparatus (EN 133)

Hand protection:

Glove material: Viton (R)

Break through time: > 480 min

Glove thickness: 0,7 mm

Vitoject® 890

Gloves must be inspected prior to use.

Replace when worn.

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Remarks: Supplementary note: The specifications are based on information and tests from similar substances by analogy.

Due to varying conditions (e.g.temperature or other strains) it must be considered that the usage of a chemical protective glove in practice may be much shorter than the permeation time determined in accordance with EN 374.

Since actual conditions of practical use often deviate from standardised conditions according EN 374 the glove manufacturer recommends to use the chemical protective glove in practice not longer than 50% of the recommended permeation time.

Manufacturer's directions for use should be observed because of great diversity of types .

Suitable gloves tested according EN 374 are supplied e.g. from KCL GmbH, D-36124 Eichenzell, Vertrieb@kcl.de

Eye protection:

Safety goggles

Face-shield

Skin and body protection:

Protective footwear

Environmental exposure controls

Handle in accordance with local environmental regulations and good industrial practices.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|-----------------------------|-------------------------|
| Form | : Liquefied gas |
| Colour | : colourless |
| Odour | : weak |
| molecular weight | : 134,03 g/mol |
| Melting point/range | : -103 °C |
| Boiling point/boiling range | : 15,3 °C |
| Flash point | : Not applicable |
| Flammability (solid, gas) | : no data available |
| Ignition temperature | : 412 °C |
| Lower explosion limit | : None |
| Upper explosion limit | : None |
| Vapour pressure | : 1.227 hPa at 20 °C |
| Vapour pressure | : 3.882 hPa |

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| | |
|--|---|
| | at 54,4 °C |
| Density | : 1,32 g/cm ³ at 20 °C |
| pH | : neutral |
| Water solubility | : 7,18 g/l |
| Solubility in other solvents | : Medium: Methanol partly soluble |
| Solubility in other solvents | : Medium: Diethylether partly soluble |
| Partition coefficient: n-octanol/water | : log Pow 1,35 The product is more soluble in octanol. |
| Relative vapour density | : 4,6 (Air = 1.0) |
| Evaporation rate | : < 1 Method: Compared to Ether (anhydrous). |
| Evaporation rate | : > 1 Method: Compared to CCl ₄ . |

9.2 Other Information

no additional data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions.
Hazardous polymerisation does not occur.

10.2. Chemical stability

no data available

10.3. Possibility of hazardous reactions

no data available

10.4. Conditions to avoid

Heating will cause pressure rise with risk of bursting
Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.
Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.

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10.5. Incompatible materials

oxidising substances
Possible incompatibility with alkali sensitive materials.
Powdered metals

10.6. Hazardous decomposition products

Halogenated compounds
Hydrogen fluoride
Carbonyl halides
Carbon oxides

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute oral toxicity:
Not applicable

Acute dermal toxicity:
LD50
Species: Rabbit
Value: > 2.000 mg/kg

Acute inhalation toxicity:
LC50
Species: Rat
Value: > 200000 ppm
Exposure time: 4 h

LC50
Species: Mouse
Value: > 100000 ppm
Exposure time: 4 h

Skin irritation:
No skin irritation

Eye irritation:
no data available

Respiratory or skin sensitisation:
Classification: non-sensitizing

Repeated dose toxicity:
Species: Rat
Exposure time: 28 d
NOAEL: 500 ppm

Germ cell mutagenicity:
Cell type: Human lymphocytes
Result: Weak positive activation without S9 at 30% v/v; not active with S9 up to 70% v/v.

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Test Method: Ames test
Metabolic activation: with and without metabolic activation
Result: negative

Species: Mouse
Cell type: Bone marrow
Application Route: Inhalation
Method: Mutagenicity (micronucleus test)
Result: negative

Aspiration hazard:
no data available

Other information:
Inhalation: May cause cardiac arrhythmia.

SECTION 12: Ecological information

12.1. Toxicity

Toxicity to fish:
LC50
Species: Oncorhynchus mykiss (rainbow trout)
Value: > 81,8 mg/l
Exposure time: 96 h

NOEC
Species: Oncorhynchus mykiss (rainbow trout)
Value: > 10 mg/l
Exposure time: 96 h

Toxicity to aquatic plants:
EC50
Growth inhibition
Species: Algae
Value: > 118 mg/l
Method: OECD Test Guideline 201

Toxicity to aquatic invertebrates:
EC50
Species: Daphnia magna (Water flea)
Value: > 97,9 mg/l
Exposure time: 48 h

NOEC
Species: Daphnia magna (Water flea)
Value: > 97,9 mg/l
Exposure time: 48 h

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12.2. Persistence and degradability

no data available

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

Accumulation in aquatic organisms is unlikely.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product:

Offer surplus and non-recyclable solutions to a licensed disposal company. Refer to manufacturer/supplier for information on recovery/recycling.

Remarks:

To present knowledge of the supplier, this product is not regarded as hazardous waste as defined by EU Directive 91/689/EC. Classification: 14.06.01

Further information:

Provisions relating to waste:

EC Directive 2006/12/EC; 2008/98/EEC

Regulation No. 1013/2006

For personal protection see section 8.

SECTION 14: Transport information

ADR/RID

| | | |
|---------------------------|---|---|
| UN Number | : | 3163 |
| Description of the goods | : | LIQUEFIED GAS, N.O.S. (1,1,1,3,3-PENTAFLUOROPROPANE) |
| Class | : | 2 |
| Classification Code | : | 2A |
| Hazard Identification | : | 20 |
| Number | : | |
| ADR/RID-Labels | : | 2.2 |
| Environmentally hazardous | : | no |

IATA

| | | |
|-----------|---|------|
| UN Number | : | 3163 |
|-----------|---|------|

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Description of the goods : Liquefied gas, n.o.s.
(1,1,1,3,3-Pentafluoropropane)
Class : 2.2
Hazard Labels : 2.2

IMDG

UN Number : 3163
Description of the goods : LIQUEFIED GAS, N.O.S.
(1,1,1,3,3-PENTAFLUOROPROPANE)
Class : 2.2
Hazard Labels : 2.2
EmS Number : F-C, S-V
Marine pollutant : no

SECTION 15: Regulatory information

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

Other inventory information

US. Toxic Substances Control Act
On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act
On the inventory, or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)
All components of this product are on the Canadian DSL.

Japan. Kashin-Hou Law List
On the inventory, or in compliance with the inventory

Korea. Toxic Chemical Control Law (TCCL) List
On the inventory, or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act
Not in compliance with the inventory

China. Inventory of Existing Chemical Substances
On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand
On the inventory, or in compliance with the inventory

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out.

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SECTION 16: Other information

Text of H-statements referred to under heading 3

1,1,1,3,3-Pentafluoropropane : H280 Contains gas under pressure; may explode if heated.

Further information

All directives and regulations refer to amended versions.

Vertical lines in the left hand margin indicate a relevant amendment from the previous version.

Abbreviations:

EC European Community

CAS Chemical Abstracts Service

DNEL Derived no effect level

PNEC Predicted no effect level

vPvB Very persistent and very bioaccumulative substance

PBT Persistent, bioaccumulative and toxic substance

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user.

This information should not constitute a guarantee for any specific product properties.

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SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Genetron® 245fa
MSDS Number : 000000009878
Product Use Description : Refrigerant, Heat transfer fluid

Company : Honeywell International, Inc.
101 Columbia Road
Morristown, NJ 07962-1057

For more information call : 800-522-8001
(Monday-Friday, 9:00am-5:00pm)

In case of emergency call : **Medical: 1-800-498-5701 or +1-651-523-0309**
: **Transportation: 1-800-424-9300 or +1-703-527-3887**
: (24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION**Emergency Overview**

Form : Liquefied gas

Color : colourless

Odor : weak

Hazard Summary : **WARNING!** Contains gas under pressure; may explode if heated. This product is not flammable at ambient temperatures and atmospheric pressure. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating. Inhalation may cause central nervous system effects. May cause cardiac arrhythmia. May cause drowsiness and dizziness. Do not breathe vapour. May cause eye irritation. Avoid contact with skin, eyes and clothing. At higher temperatures, (>250 C), decomposition products may include hydrofluoric acid (HF) and carbonyl halides. The ACGIH Threshold Limit Values (2007) for Hydrogen Fluoride are TLV-TWA 0.5 ppm and Ceiling Exposure Limit 2 ppm.

Potential Health Effects

Skin : No skin irritation

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- Eyes : May cause eye irritation.
- Ingestion : Unlikely route of exposure.
Effects due to ingestion may include:
Gastrointestinal discomfort
- Inhalation : May cause cardiac arrhythmia.
Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Vapours may cause drowsiness and dizziness.
Inhalation may cause central nervous system effects.
- Chronic Exposure : None known.

Carcinogenicity

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

- Formula : CHF₂CH₂CF₃
- Chemical nature : Substance

| Chemical Name | CAS-No. | Concentration |
|------------------------------|----------|---------------|
| 1,1,1,3,3-Pentafluoropropane | 460-73-1 | 100.00% |

SECTION 4. FIRST AID MEASURES

- Inhalation : Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.
- Skin contact : After contact with skin, wash immediately with plenty of water. If symptoms persist, call a physician. Take off all contaminated clothing immediately. Wash contaminated clothing before re-use.
- Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.
- Ingestion : Do not induce vomiting without medical advice. Never give

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anything by mouth to an unconscious person. Call a physician immediately.

Notes to physician

Treatment : Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions.

SECTION 5. FIREFIGHTING MEASURES

Flash point : not applicable

Ignition temperature : 412 °C (774 °F)

Lower explosion limit : None

Upper explosion limit : None

Suitable extinguishing media : The product is not flammable.
ASHRAE 34
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific hazards during firefighting : This product is not flammable at ambient temperatures and atmospheric pressure.
However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.
Cool closed containers exposed to fire with water spray.
Do not allow run-off from fire fighting to enter drains or water courses.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Exposure to decomposition products may be a hazard to health.
In case of fire hazardous decomposition products may be produced such as:
Hydrogen fluoride
Carbon monoxide
Carbon dioxide (CO₂)
Carbonyl halides

Special protective : In the event of fire and/or explosion do not breathe fumes.

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equipment for firefighters

Wear self-contained breathing apparatus and protective suit.
No unprotected exposed skin areas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions

: Wear personal protective equipment.
Immediately evacuate personnel to safe areas.
Keep people away from and upwind of spill/leak.
Remove all sources of ignition.
Vapours are heavier than air and can cause suffocation by
reducing oxygen available for breathing.
Ensure adequate ventilation.

Environmental precautions

: Should not be released into the environment.
Do not flush into surface water or sanitary sewer system.
Prevent further leakage or spillage if safe to do so.
Prevent spreading over a wide area (e.g. by containment or oil
barriers).

Methods for cleaning up

: Contain spillage, and then collect with non-combustible
absorbent material, (e.g. sand, earth, diatomaceous earth,
vermiculite) and place in container for disposal according to
local / national regulations (see section 13).

SECTION 7. HANDLING AND STORAGE**Handling**

Handling

: Handle with care.
Do not get in eyes, on skin, or on clothing.
Do not use in areas without adequate ventilation.
Perform filling operations only at stations with exhaust
ventilation facilities.
Open drum carefully as content may be under pressure.
Do not breathe vapours or spray mist.

Advice on protection
against fire and explosion

: Can form a combustible mixture with air at pressures above
atmospheric pressure.
Keep product and empty container away from heat and
sources of ignition.

StorageRequirements for storage
areas and containers

: Store away from incompatible substances.
Keep away from direct sunlight.
Keep containers tightly closed in a dry, cool and well-ventilated

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place.
Ensure adequate ventilation, especially in confined areas.
Keep in original packaging, tightly closed.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- | | | |
|--------------------------|---|---|
| Protective measures | : | Ensure that eyewash stations and safety showers are close to the workstation location. Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing. |
| Engineering measures | : | Use with local exhaust ventilation. Perform filling operations only at stations with exhaust ventilation facilities. |
| Eye protection | : | Do not wear contact lenses. Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear: Goggles or face shield, giving complete protection to eyes |
| Hand protection | : | Impervious butyl rubber gloves Neoprene gloves Gloves must be inspected prior to use. Replace when worn. |
| Skin and body protection | : | Wear as appropriate: Solvent-resistant gloves Solvent-resistant apron and boots If splashes are likely to occur, wear: Protective suit |
| Respiratory protection | : | In case of insufficient ventilation, wear suitable respiratory equipment. Wear a positive-pressure supplied-air respirator. For rescue and maintenance work in storage tanks use self-contained breathing apparatus. |
| Hygiene measures | : | Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas. Remove and wash contaminated clothing before re-use. Contaminated work clothing should not be allowed out of the workplace. Keep working clothes separately. Wash hands before breaks and immediately after handling the product. |

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Exposure Guidelines

1,1,1,3,3-
Pentafluoropropane

| | | | | |
|----------|------|-----|---------|-------------|
| 460-73-1 | WEEL | TWA | 300 ppm | 1,644 mg/m3 |
|----------|------|-----|---------|-------------|

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|--|--|
| Form | : Liquefied gas |
| Color | : colourless |
| Odor | : weak |
| Molecular Weight | : 134.03 g/mol |
| pH | : neutral |
| Melting point/range | : -103 °C (-153 °F) |
| Boiling point/boiling range | : 15.3 °C (59.5 °F) |
| Vapor pressure | : 1,227 hPa at 20 °C (68 °F) |
| Vapor pressure | : 3,882 hPa at 54.4 °C (129.9 °F) |
| Relative vapour density | : 4.6 (Air = 1.0) |
| Density | : 1.32 g/cm3 at 20 °C (68 °F) |
| Water solubility | : 7.18 g/l |
| Partition coefficient: n-octanol/water | : log Pow: 1.35 The product is more soluble in octanol. |
| Solubility in other solvents | : Medium: Methanol partly soluble : Medium: Diethylether partly soluble |

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SECTION 10. STABILITY AND REACTIVITY

| | |
|----------------------------------|--|
| Conditions to avoid | : Protect from heat/overheating. Keep away from direct sunlight. Heat, flames and sparks. |
| Materials to avoid | : Strong acids and strong bases Finely divided aluminium Sodium Potassium Calcium Magnesium Zinc Barium Lithium Strong oxidizing agents |
| Hazardous decomposition products | : In case of fire hazardous decomposition products may be produced such as: Carbon monoxide Carbon dioxide (CO ₂) Carbonyl halides Hydrogen fluoride |
| Thermal decomposition | : >250 °C |
| Hazardous reactions | : Hazardous polymerisation does not occur. Stable under normal conditions. |

SECTION 11. TOXICOLOGICAL INFORMATION

| | |
|---------------------------|--|
| Acute inhalation toxicity | : LC50: > 200000 ppm Exposure time: 4 h Species: rat Note: No deaths Evidence of transient anesthetic effect. |
| | : LC50: > 100000 ppm Exposure time: 4 h Species: mouse Note: No deaths Evidence of transient underactivity during exposure. |
| Acute dermal toxicity | : LD50: > 2,000 mg/kg Species: rabbit |

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- Sensitisation** : Cardiac sensitization
Species: dogs
Note: No effects noted at 35,000 ppm, the threshold for induction of cardiac arrhythmias in the presence of injected adrenalin was 44,000 ppm.
- Repeated dose toxicity** : Species: rat
NOEL: 50000 ppm
Note: Embryotoxicity Not a teratogen
- : Species: rat (pups)
NOEL: 50000 ppm
- : Species: rat (dams)
NOEL: 2000 ppm
Note: due to decrease in body weight gains at 10,000 ppm and 50,000 ppm
- : Species: rat
Method: 2 Generation Inhalation Toxicity
Note: Exposures 6hrs/day, 7 days/wk at 0(control), 2000, 10,000 and 50,000 ppm.
- : Species: rat (dams)
Note: Toxicity seen in dams at 10,000 and 50,000 ppm and in pups at 50,000 ppm. Increased mortality late in the lactation phase of the study.
- : Species: rat
Note: 28-day Inhalation Study NOAEL (No observed adverse effect level) - 50,000 ppm NOEL - 500 ppm Dose levels: 0,500, 2000, 10,000 and 50,000 ppm
- : Species: rat
Note: 90-day Inhalation Study Dose levels: 0,500, 2000, 10,000 and 50,000 ppm NOAEL (No observed adverse effect level) - 2,000 ppm
- : Note: Overall, subchronic studies showed dose-related increases in urinary fluoride levels, urine volumes and water consumption. Increases were noted in hematological parameters, BUN levels and serum liver enzyme activities (GOT, GPT). These increases did not follow a dose response; however, they indicate that HFC-245fa is metabolized in the liver. Significant recovery was noted in these parameters following a 2-week, non-exposure period which followed the 28-day exposure period. No histopathological effects were

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noted in the 28-day study. The 90-day study noted an increase in incidence and severity (trace to moderate) of myocarditis (inflammation of the heart muscle) at 10,000 and 50,000 ppm. This was not noted at the 500 or 2,000 ppm dose levels nor was it seen the 28-day study at 50,000 ppm.

- Genotoxicity in vitro : Cell type: Human lymphocytes
Result: Weak positive activation without S9 at 30% v/v; not active with S9 up to 70% v/v.
- : Test Method: Ames test
Metabolic activation: with or without metabolic activation
Result: negative
- Genotoxicity in vivo : Species: mouse
Cell type: Bone marrow
Application Route: Inhalation
Method: Mutagenicity (micronucleus test)
Result: negative

SECTION 12. ECOLOGICAL INFORMATION**Ecotoxicity effects**

- Toxicity to fish : EC50: > 81.8 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
- : NOEC: > 10 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
- Toxicity to daphnia and other aquatic invertebrates. : EC50: > 97.9 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
- : NOEC: > 97.9 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
- Toxicity to algae : Growth inhibition
EC50: > 118 mg/l
Species: Algae
Method: OECD Test Guideline 201

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Further information on ecologyAdditional ecological
information

: This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered. Refer to sections 610 and 612 for list of acceptable and unacceptable uses for this product.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Information: Observe all Federal, State, and Local Environmental regulations.

SECTION 14. TRANSPORT INFORMATION

| | | |
|-------------|--|---|
| DOT | UN/ID No. | : UN 3163 |
| | Proper shipping name | : LIQUEFIED GAS, N.O.S. (1,1,1,3,3-Pentafluoropropane) |
| | Class | 2.2 |
| | Packing group | |
| | Hazard Labels | 2.2 |
| IATA | UN/ID No. | : UN 3163 |
| | Description of the goods | : LIQUEFIED GAS, N.O.S. (1,1,1,3,3-Pentafluoropropane) |
| | Class | : 2.2 |
| | Hazard Labels | : 2.2 |
| | Packing instruction (cargo aircraft) | : 200 |
| | Packing instruction (passenger aircraft) | : 200 |
| | | |
| IMDG | UN/ID No. | : UN 3163 |
| | Description of the goods | : LIQUEFIED GAS, N.O.S. (1,1,1,3,3-PENTAFLUOROPROPANE) |
| | Class | : 2.2 |
| | Hazard Labels | : 2.2 |
| | EmS Number | : F-C |
| | Marine pollutant | : no |

SECTION 15. REGULATORY INFORMATION**Inventories**

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| | | |
|---|---|---|
| 1907/2006 (EU) | : | This mixture contains only ingredients which have been registered according to Regulation (EC) No. 1907/2006 (REACH). |
| US. Toxic Substances Control Act | : | On TSCA Inventory |
| Australia. Industrial Chemical (Notification and Assessment) Act | : | On the inventory, or in compliance with the inventory |
| Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 144) | : | All components of this product are on the Canadian DSL list. |
| Japan. Kashin-Hou Law List | : | On the inventory, or in compliance with the inventory |
| Korea. Existing Chemicals Inventory (KECI) | : | On the inventory, or in compliance with the inventory |
| Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act | : | Not in compliance with the inventory |
| China. Inventory of Existing Chemical Substances | : | 1,1,1,3,3-Pentafluoropropane 460-73-1 On the inventory, or in compliance with the inventory |
| NZIOC - New Zealand | : | On the inventory, or in compliance with the inventory |

National regulatory information

| | | |
|-----------------------------|---|--|
| SARA 311/312 Hazards | : | Acute Health Hazard Sudden Release of Pressure Hazard |
|-----------------------------|---|--|

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California Prop. 65 : WARNING! This product contains a chemical known to the State of California to cause cancer.
Dichloromethane 75-09-2

Massachusetts RTK : Dichloromethane 75-09-2

Pennsylvania RTK : Dichloromethane 75-09-2

WHMIS Classification : A
This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

Global warming potential : 950

Ozone depletion potential (ODP) : 0

SECTION 16. OTHER INFORMATION

| | HMIS III | NFPA |
|-----------------|-----------------|-------------|
| Health hazard | : 2 | 2 |
| Flammability | : 1 | 1 |
| Physical Hazard | : 0 | |
| Instability | : | 0 |