

Genetron Performax® LT (R-407F)**00000013866**

Version 1.6

Revision Date 09/28/2015

Print Date 03/10/2017

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Genetron Performax® LT (R-407F)

Number : 00000013866

Product Use Description : Refrigerant

Manufacturer or supplier's details : Honeywell International Inc.
115 Tabor Road
Morris Plains, NJ 07950-2546

For more information call : 800-522-8001
+1-973-455-6300
(Monday-Friday, 9:00am-5:00pm)

In case of emergency call : **Medical: 1-800-498-5701 or +1-303-389-1414**
: **Transportation (CHEMTREC): 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 : clear and colourless

Odor : ether-like

Classification of the substance or mixture

Classification of the substance or mixture : Gases under pressure, Liquefied gas
Simple Asphyxiant

GHS Label elements, including precautionary statements

Symbol(s) :



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Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements : **Storage:**
Protect from sunlight. Store in a well-ventilated place.

Hazards not otherwise classified : May cause frostbite.
May cause cardiac arrhythmia.
May cause eye and skin irritation.

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

Synonyms : Mixture of 1,1,1,2-Tetrafluoroethane, Pentafluoroethane and Difluoromethane

Chemical nature : Mixture

| Chemical Name | CAS-No. | Concentration |
|---------------------------|----------|---------------|
| 1,1,1,2-Tetrafluoroethane | 811-97-2 | 40.00 % |
| Difluoromethane | 75-10-5 | 30.00 % |
| Pentafluoroethane | 354-33-6 | 30.00 % |

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 there is evidence of frostbite, bathe (do not rub) with

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lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a physician.

Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.

Ingestion : Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. 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. Treat frost-bitten areas as needed.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : The product is not flammable.
ASHRAE 34
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

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.
Contents under pressure.
Container may rupture on heating.
Cool closed containers exposed to fire with water spray.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
In case of fire hazardous decomposition products may be produced such as:
Hydrogen fluoride
Carbon monoxide
Carbon dioxide (CO₂)
Carbonyl halides

Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit.

Further information : Use extinguishing measures that are appropriate to local

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circumstances and the surrounding environment.

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.
Avoid skin contact with leaking liquid (danger of frostbite).
Ventilate the area.
After release, disperses into the air.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Avoid accumulation of vapours in low areas.
Unprotected personnel should not return until air has been tested and determined safe.
Ensure that the oxygen content is $\geq 19.5\%$.
- Environmental precautions : Prevent further leakage or spillage if safe to do so.
The product evaporates readily.
- Methods for cleaning up : Ventilate the area.

SECTION 7. HANDLING AND STORAGE**Handling**

- Handling : Wear personal protective equipment.
Do not breathe vapour.
Avoid contact with skin, eyes and clothing.
Follow all standard safety precautions for handling and use of compressed gas cylinders.
Keep away from heat.
Use authorized cylinders only.
Protect cylinders from physical damage.
Do not puncture or drop cylinders, expose them to open flame or excessive heat.
Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.
Do not remove screw cap until immediately ready for use.
Always replace cap after use.
- Advice on protection against fire and explosion : The product is not flammable.
Can form a combustible mixture with air at pressures above atmospheric pressure.

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Storage

Requirements for storage areas and containers : Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use.
 Keep containers tightly closed in a dry, cool and well-ventilated place.
 Storage rooms must be properly ventilated.
 Ensure adequate ventilation, especially in confined areas.
 Protect cylinders from physical damage.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures : Do not breathe vapour.
 Avoid contact with skin, eyes and clothing.
 Ensure that eyewash stations and safety showers are close to the workstation location.

Engineering measures : General room ventilation is adequate for storage and handling.
 Perform filling operations only at stations with exhaust ventilation facilities.

Eye protection : 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 : Leather gloves
 In case of contact through splashing:
 Protective gloves
 Neoprene gloves
 Polyvinyl alcohol or nitrile- butyl-rubber gloves

Skin and body protection : Avoid skin contact with leaking liquid (danger of frostbite).
 Wear cold insulating gloves/ face shield/ eye protection.

Respiratory protection : In case of insufficient ventilation wear suitable respiratory equipment.
 Wear a positive-pressure supplied-air respirator.
 Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
 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.
 Ensure adequate ventilation, especially in confined areas.
 Do not get in eyes, on skin, or on clothing.
 Remove and wash contaminated clothing before re-use.

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Keep working clothes separately.

Exposure Guidelines

| Components | CAS-No. | Value | Control parameters | Update | Basis |
|---------------------------|----------|--------------------------------|----------------------------|--------|-------------------------------------------------------------------|
| 1,1,1,2-Tetrafluoroethane | 811-97-2 | TWA : Time weighted average | (1,000 ppm) | | Honeywell:Limit established by Honeywell International Inc. |
| 1,1,1,2-Tetrafluoroethane | 811-97-2 | TWA : Time weighted average | 4,240 mg/m3 (1,000 ppm) | 2007 | WEEL:US. OARS. WEELs Workplace Environmental Exposure Level Guide |
| Pentafluoroethane | 354-33-6 | TWA : Time weighted average | (1,000 ppm) | | Honeywell:Limit established by Honeywell International Inc. |
| Difluoromethane | 75-10-5 | TWA : Time weighted average | 2,200 mg/m3 (1,000 ppm) | 2007 | WEEL:US. OARS. WEELs Workplace Environmental Exposure Level Guide |
| Difluoromethane | 75-10-5 | TWA : Time weighted average | (1,000 ppm) | 1994 | Honeywell:Limit established by Honeywell International Inc. |

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|-----------------------------|-------------------------|
| Physical state | : Liquefied gas |
| Color | : clear and colourless |
| Odor | : ether-like |
| pH | : Note: neutral |
| Boiling point/boiling range | : -45.5 °C at 1,013 hPa |

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| | |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Flash point | : Note: Not applicable |
| Lower explosion limit | : Note: None |
| Upper explosion limit | : Note: None |
| Vapor pressure | : 10,218 hPa at 21.1 °C(70.0 °F) 24,621 hPa at 54.4 °C(129.9 °F) |
| Vapor density | : Note: not determined |
| Density | : Note: not determined |
| Partition coefficient: n-octanol/water | : log Pow: 1.06 Note: 1,1,1,2-tetrafluoroethane (HFC-134a) log Pow: 1.48 Note: Ethane, pentafluoro- (HFC-125) |
| Ignition temperature | : Note: no data available |

SECTION 10. STABILITY AND REACTIVITY

| | |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chemical stability | : Stable under normal conditions. |
| Possibility of hazardous reactions | : Hazardous polymerisation does not occur. |
| Conditions to avoid | : Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic decomposition products. |

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| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Incompatible materials to avoid | : Potassium Calcium Powdered metals Finely divided aluminium Finely divided magnesium Zinc |
| Hazardous decomposition products | : In case of fire hazardous decomposition products may be produced such as: Gaseous hydrogen fluoride (HF). Carbonyl halides Carbon monoxide Carbon dioxide (CO ₂) |

SECTION 11. TOXICOLOGICAL INFORMATION

| | |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Acute inhalation toxicity 1,1,1,2-Tetrafluoroethane | : LC50: > 500000 ppm Exposure time: 4 h Species: Rat |
| Difluoromethane | : LC50: > 520000 ppm Exposure time: 4 h Species: Rat |
| Pentafluoroethane | : > 769000 ppm Exposure time: 4 h Species: Rat |
| Sensitisation 1,1,1,2-Tetrafluoroethane | : Cardiac sensitization Species: dogs Note: No-observed-effect level 50 000 ppm Lowest observed effect level 75 000 ppm |
| Difluoromethane | : Cardiac sensitization Species: dogs Note: No-observed-effect level >350 000 ppm |
| Pentafluoroethane | : Cardiac sensitization |

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| | |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| | Species: dogs Note: No-observed-effect level 75 000 ppm Lowest observed effect level 100 000 ppm |
| Repeated dose toxicity 1,1,1,2-Tetrafluoroethane | : Species: Rat NOEL: 40000 ppm |
| Difluoromethane | : Species: Rat Application Route: Inhalation Exposure time: (90 d) NOEL: 50000 ppm Subchronic toxicity |
| Pentafluoroethane | : Species: Rat Application Route: Inhalation Exposure time: (4 Weeks) NOEL: 50000 ppm Subchronic toxicity |
| Genotoxicity in vitro 1,1,1,2-Tetrafluoroethane | : Note: In vitro tests did not show mutagenic effects |
| Difluoromethane | : Test Method: Ames test Result: negative |
| Pentafluoroethane | : Test Method: Ames test Result: negative |
| | : Cell type: Human lymphocytes Result: negative Method: Mutagenicity (in vitro mammalian cytogenetic test) |
| | : Test Method: Chromosome aberration test in vitro Result: negative |
| | : Cell type: Human lymphocytes Result: negative |
| | : Cell type: Chinese Hamster Ovary Cells Result: negative |
| Genotoxicity in vivo Difluoromethane | : Species: Mouse Cell type: Bone marrow Method: Mutagenicity (micronucleus test) |

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Result: negative

Teratogenicity
Difluoromethane: Species: Rat
Dose: NOEL - 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.Species: Rabbit
Dose: NOEL - 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.

Pentafluoroethane

: Species: Rabbit
Application Route: Inhalation exposure
NOAEL, Teratog: 50,000 ppm
NOAEL, Maternal: 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.Species: Rat
Application Route: Inhalation exposure
NOAEL, Teratog: 50,000 ppm
NOAEL, Maternal: 50,000 ppm
Note: Did not show teratogenic effects in animal experiments.

Further information

: Note: Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite. May cause cardiac arrhythmia.

SECTION 12. ECOLOGICAL INFORMATIONBiodegradability
Difluoromethane

: Note: Minimal

Pentafluoroethane

: Result: Not readily biodegradable.
Value: 5 %
Method: OECD 301 D**Further information on ecology**Additional 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

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residual must be recovered.

SECTION 13. DISPOSAL CONSIDERATIONS

- Disposal methods : Observe all Federal, State, and Local Environmental regulations.
- Note : This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

SECTION 14. TRANSPORT INFORMATION

- DOT** UN/ID No. : UN 3163
 Proper shipping name : LIQUEFIED GAS, N.O.S.
 (1,1,1,2-Tetrafluoroethane, Difluoromethane, Pentafluoroethane)
 Class : 2.2
 Packing group :
 Hazard Labels : 2.2
- IATA** UN/ID No. : UN 3163
 Description of the goods : LIQUEFIED GAS, N.O.S.
 (1,1,1,2-Tetrafluoroethane, Difluoromethane, Pentafluoroethane)
 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.
 (1,1,1,2-TETRAFLUOROETHANE, DIFLUOROMETHANE, PENTAFLUOROETHANE)
 Class : 2.2
 Hazard Labels : 2.2
 EmS Number : F-C, S-V
 Marine pollutant : no

SECTION 15. REGULATORY INFORMATION**Inventories**

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| | |
|--------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 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 | : On the inventory, or 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 |

National regulatory information

| | |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SARA 302 Components | : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302. |
| SARA 313 Components | : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313. |
| SARA 311/312 Hazards | : Sudden Release of Pressure Hazard Acute Health 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 |
| | : | WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Chloromethane | 74-87-3 |
| Massachusetts RTK | : | Dichloromethane | 75-09-2 |
| New Jersey RTK | : | Difluoromethane | 75-10-5 |
| Pennsylvania RTK | : | Difluoromethane | 75-10-5 |
| WHMIS Classification | : | A: Compressed Gas 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. | |

SECTION 16. OTHER INFORMATION

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

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

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

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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.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

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Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group