

Genetron Performax™ LT

Version 1

Revision Date 01/28/2010

Print Date 02/09/2010

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Genetron Performax™ LT
MSDS Number : 000000013866
Product Use Description : Refrigerant

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
: **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 : clear and colourless

Odor : ether-like

Hazard Summary : **WARNING!** Contains gas under pressure; may explode if heated. This product is not flammable at ambient temperatures and atmospheric pressure. Gas reduces 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. Irritating to eyes and skin. 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 : Irritating to skin.
Rapid evaporation of the liquid may cause frostbite.

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- Eyes : Causes serious eye irritation.
May cause frostbite.
- Ingestion : Unlikely route of exposure.
Effects due to ingestion may include:
Gastrointestinal discomfort
- Inhalation : Gas reduces 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.
Vapours may cause drowsiness and dizziness.
Effects of breathing high concentrations of vapour may include:
Cardiac arrhythmias
- 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

Component	CAS-No.	Weight percent
Norflurane	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 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

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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. FIRE-FIGHTING MEASURES

Flash point : not applicable

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.

Specific hazards during fire fighting : 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 fire-fighters : Wear self-contained breathing apparatus and protective suit.

Additional advice : 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

1,1,1,2-Tetrafluoroethane	811-97-2	WEEL	TWA	1,000 ppm	4,240 mg/m ³
		HONEYWELL	TWA	1,000 ppm	
Difluoromethane	75-10-5	WEEL	TWA	1,000 ppm	2,200 mg/m ³
		HONEYWELL	TWA	1,000 ppm	
Pentafluoroethane	354-33-6	WEEL	TWA	1,000 ppm	4,900 mg/m ³
		HONEYWELL	TWA	1,000 ppm	

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	: Liquefied gas
Color	: clear and colourless
Odor	: ether-like
pH	: neutral
Boiling point/boiling range	: -45.5 °C (-49.9 °F) at 1,013 hPa
Vapor pressure	: 10,218 hPa at 21.1 °C (70.0 °F)
Vapor pressure	: 24,621 hPa at 54.4 °C (129.9 °F)
Relative vapour density	: not determined
Density	: not determined
Partition coefficient: n-octanol/water	: log Pow: 1.06 1,1,1,2-tetrafluoroethane (HFC-134a)
Partition coefficient: n-octanol/water	: log Pow: 1.48

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Ethane, pentafluoro- (HFC-125)

SECTION 10. STABILITY AND REACTIVITY

- 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.
Can form a combustible mixture with air at pressures above atmospheric pressure.
Do not mix with oxygen or air above atmospheric pressure.
- Materials to avoid : Finely divided aluminium
Potassium
Calcium
Powdered metals
Aluminium
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 (CO₂)
- Hazardous reactions : Hazardous polymerisation does not occur.
Stable under normal conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

- Acute oral toxicity : no data available
- Acute dermal toxicity : no data available
- Acute inhalation toxicity : LC50 rat
Dose: > 500000 ppm
Exposure time: 4 h
Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)
- Acute inhalation toxicity : LC50 rat
Dose: 520000 ppm
Exposure time: 4 h
Test substance: Difluoromethane (HFC-32)

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Acute inhalation toxicity	: LC50 rat Dose: > 769000 ppm Exposure time: 4 h Test substance: Ethane, pentafluoro- (HFC-125)
Skin irritation	: no data available
Eye irritation	: no data available
Sensitisation	: Cardiac sensitization dogs Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) No-observed-effect level 50,000 ppm Lowest observable effect level 75,000 ppm
Sensitisation	: Cardiac sensitization dogs Test substance: Difluoromethane (HFC-32) No-observed-effect level >350,000 ppm
Sensitisation	: Cardiac sensitization dogs Test substance: Ethane, pentafluoro- (HFC-125) No-observed-effect level 75,000 ppm Lowest observable effect level 100,000 ppm
Repeated dose toxicity	: Inhalation rat Subchronic toxicity NOEL: 50000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)
Repeated dose toxicity	: rat Chronic toxicity NOEL: 10000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)
Repeated dose toxicity	: Inhalation rat Subchronic toxicity NOEL: 50000 ppm Test substance: Difluoromethane (HFC-32)
Repeated dose toxicity	: Inhalation rat Subchronic toxicity NOEL: >= 50000 ppm Test substance: Ethane, pentafluoro- (HFC-125)
Genotoxicity in vitro	: Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) In vitro tests did not show mutagenic effects
Genotoxicity in vitro	: Test substance: Difluoromethane (HFC-32) In vitro tests did not show mutagenic effects

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Genotoxicity in vitro	:	Test substance: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effects
Teratogenicity	:	rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm
Teratogenicity	:	rabbit Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm
Teratogenicity	:	rat Test substance: Difluoromethane (HFC-32) NOEL - 50,000 ppm
Teratogenicity	:	rabbit Test substance: Difluoromethane (HFC-32) NOEL - 50,000 ppm
Teratogenicity	:	rat Test substance: Ethane, pentafluoro- (HFC-125) NOEL - 50,000 ppm
Teratogenicity	:	rabbit Test substance: Ethane, pentafluoro- (HFC-125) NOEL - 50,000 ppm
Additional advice	:	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 INFORMATION

Toxicity to fish	:	Species: not specified no data available
Toxicity to daphnia and other aquatic invertebrates.	:	Species: not specified no data available
Toxicity to bacteria	:	Species: not specified no data available

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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 residual must be recovered.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Information: Observe all Federal, State, and Local Environmental regulations.
 Additional advice : 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-Number	: 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 Number	: 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	Substance 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
	Marine pollutant	: no

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SECTION 15. REGULATORY INFORMATION**Inventories**

- 1907/2006 (EU) : This mixture contains only ingredients which have been subject to a pre-registration 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. 133) : 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. 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 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
 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