SAFETY DATA SHEET		Honeywell
id Harvey Part # R407FX	115 & R407FX25	SDS # Z0485
Genetron Performax®	LT (R-407F)	
0329614 ersion 2.0	Revision Date 08/22/2018	Print Date 08/23/2018
ECTION 1. 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 +1-30 Transportation (CHEMTREC): 1- +1-703-527-3887	03-389-1414 800-424-9300 or
	: : (24 hours/day, 7 days/week)	
ECTION 2. HAZARDS IDENTIF	ICATION	www.wood.wood.wood.wood.wood.wood.wood.
Emergency Overview		
Form	Liquefied gas	
Color	: clear and colourless	
Odor	: ether-like	
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enetron Performax®	LT (R-407F)	
<b>)329614</b> rsion 2.0	Revision Date 08/22/2018	Print Date 08/23/2018
		P Mit Bale 00/20/20/20/20/20/20/20/20/20/20/20/20/2
Classification of the substa	nce or mixture	
Classification of the substand or mixture	e : Gases under pressure, Liquefied g Simple Asphyxiant	jas
GHS Label elements, inclue	ding precautionary statements	
Symbol(s)		
Signal word	Warning	
Hazard statements	<ul> <li>Contains gas under pressure; may May displace oxygen and cause ratio</li> </ul>	
Precautionary statements	: <b>Storage:</b> Protect from sunlight. Store in a w	ell-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 anticipated carcinogen by NT	present at levels greater than or equal to P, IARC, or OSHA.	0.1% is identified as a known o
CTION 3. COMPOSITION/INF	ORMATION ON INGREDIENTS	-,
Synonyms	: Mixture of 1,1,1,2-Tetrafluoroethan Difluoromethane	e, Pentafluoroethane and
	Page 2 / 17	<u> </u>

## Honeywell SAFETY DATA SHEET Genetron Performax® LT (R-407F) 10329614 Version 2.0 Revision Date 08/22/2018 Print Date 08/23/2018 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 General advice • : First aider needs to protect himself. Move out of dangerous area. Take off all contaminated clothing immediately. 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 lukewarm, not hot. If symptoms persist, call a physician. : Unlikely route of exposure. As this product is a gas, refer to the Ingestion inhalation section. Do not induce vomiting without medical advice. Call a physician immediately. Notes to physician Page 3 / 17

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# Genetron Performax® LT (R-407F)

## 10329614

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ices of cardiac rhythm, nephrine, should be used with ons of emergency life support. d be directed at the control of ons. Treat frost-bitten areas as
nt foam, dry chemical or
ambient temperatures and when mixed with air under ignition sources. g. to fire with water spray. I can cause suffocation by eathing.
oparatus and protective suit.
are appropriate to local ng environment.

#### Honeywell SAFETY DATA SHEET Genetron Performax® LT (R-407F) 10329614 Revision Date 08/22/2018 Version 2.0 Print Date 08/23/2018 Personal precautions. Wear personal protective equipment. Immediately evacuate personnel to safe areas. protective equipment and Keep people away from and upwind of spill/leak. emergency procedures 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%. Prevent further leakage or spillage if safe to do so. Environmental precautions The product evapourates readily. Methods and materials for , Ventilate the area. containment and cleaning up **SECTION 7. HANDLING AND STORAGE** Handling Precautions for safe : Wear personal protective equipment. Do not breathe vapour. handling 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 : The product is not flammable. Page 5 / 17

### Honeywell SAFETY DATA SHEET **Genetron Performax® LT (R-407F)** 10329614 Print Date 08/23/2018 Version 2.0 Revision Date 08/22/2018 fire and explosion Can form a combustible mixture with air at pressures above atmospheric pressure. Storage Pressurized container: protect from sunlight and do not expose Conditions for safe storage, : including any to temperatures exceeding 50 °C. Do not pierce or burn, even incompatibilities 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. Wear as appropriate: Eye protection 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 Avoid skin contact with leaking liquid (danger of frostbite). Skin and body protection Wear cold insulating gloves/ face shield/ eye protection. Page 6 / 17

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## Genetron Performax® LT (R-407F)

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Respiratory protection	: In case of insufficient ventilation we	ar suitable respiratory
	equipment. Wear a positive-pressure supplied-a Vapours are heavier than air and ca reducing oxygen available for breat For rescue and maintenance work i self-contained breathing apparatus.	an cause suffocation by hing. n storage tanks use
Hygiene measures	<ul> <li>Handle in accordance with good inc practice.</li> <li>Ensure adequate ventilation, espec</li> <li>Do not get in eyes, on skin, or on cl</li> <li>Remove and wash contaminated cl</li> <li>Keep working clothes separately.</li> </ul>	ially in confined areas. othing.

#### **Exposure Guidelines**

Components	CAS-No,	Value	Control parameters	Upda te	Basis
1,1,1,2-Tetrafluor oethane	811-97-2	TWA : Time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.

1,1,1,2-Tetrafluor oethane	811-97-2	TWA : Time weighted average	4,240 mg/m3 (1,000 ppm)	2007	WEEL:US. OARS. WEELs Workplace Environmental Exposure Level Guide
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Pentafluoroethan e	354-33-6	TWA : Time weighted average	4,900 mg/m3 (1,000 ppm)	2007	WEEL:US. OARS. WEELs Workplace Environmental Exposure Level Guide
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Pentafluoroethan e	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.
TION 9. PHYSICAL A		,			
Physical state	: Lic	uefied gas	t.		•
Color	: cle	ear and colou	irless		
Odor	: eth	ner-like			
рН	: Nc	ote: neutral			
Boiling point/boiling ra	nge : -4	5.5 °C at 1,0	)13 hPa		
Flash point	: Nc	ote: Not appli	cable		
Lower explosion limit	: Nc	ote: None			
		Page 8	/ 17		

AFETY DATA SHEET	Г	Honeywell
	IT (D 407E)	
enetron Performax® )329614	LI (R-407P)	
rsion 2.0	Revision Date 08/22/2018	Print Date 08/23/2018
Upper explosion limit	: Note: None	
Vapor pressure	: 10,218 hPa at 21.1 °C(70.0 °F) 24,621 hPa	
Vapor density	at 54.4 °C(129.9 °F) : Note: not determined	
Density	: Note: not determined	
Partition coefficient: n-octanol/water	, i log Pow: 1.06 Note: 1,1,1,2-tetrafluoroethane (HFC	c-134a)
	log Pow: 1.48 Note: Ethane, pentafluoro- (HFC-128	5)
Ignition temperature	: Note: no data available	
ECTION 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 s to temperatures exceeding 50 °C. Decomposes under high temperature Some risk may be expected of corro	e.
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## Honeywell SAFETY DATA SHEET **Genetron Performax® LT (R-407F)** 10329614 Version 2.0 Revision Date 08/22/2018 Print Date 08/23/2018 decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure. Incompatible materials : Potassium Calcium Powdered metals Finely divided aluminium Finely divided magnesium Zinc Hazardous decomposition : Halogenated compounds Hydrogen fluoride products Carbonyl halides Carbon oxides 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 : Cardiac sensitization 1,1,1,2-Tetrafluoroethane Species: dogs Page 10 / 17

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# Genetron Performax® LT (R-407F)

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	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 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 muta	agenic effects
Difluoromethane	: Test Method: Ames test Result: negative	
Pentafluoroethane	: Test Method: Ames test	
	Result: negative	

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329614 sion 2.0	Revision Date 08/22/2018	Print Date 08/23/20
561 2.0		1 mil Date 00/20/20
	Result: negative	
	: Cell type: Human lymphocytes Result: negative Method: Mutagenicity (in vitro mar	nmalian cytogenetic test)
	: Test Method: Chromosome aberra Result: negative	ation test in vitro
	: Cell type: Human lymphocytes Result: negative	
	: Cell type: Chinese Hamster Ovary Result: negative	Cells
Genotoxicity in vivo Difluoromethane	, : Species: Mouse Cell type: Bone marrow Method: Mutagenicity (micronucle Result: negative	us test)
		· · ·
Teratogenicity Difluoromethane	: Species: Rat Dose: NOEL - 50,000 ppm Note: Did not show teratogenic eff	ects in animal experiments.
	Species: Rabbit Dose: NOEL - 50,000 ppm Note: Did not show teratogenic eff	ects in animal experiments.
Pentafluoroethane	: Species: Rabbit Application Route: Inhalation expo NOAEL,Teratog: 50,000 ppm NOAEL,Maternal: 50,000 ppm Note: Did not show teratogenic eff	
	Species: Rat Application Route: Inhalation expo	sure
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enetron Performax@	® LT (R-407F)	
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rsion 2.0	Revision Date 08/22/2018	Print Date 08/23/2018
	NOAEL,Teratog: 50,000 ppm NOAEL,Maternal: 50,000 ppm Note: Did not show teratogenic effect	s in animal experiments.
Further information	: Note: Vapours are heavier than air a by reducing oxygen available for breat of the liquid may cause frostbite. May arrhythmia.	athing. Rapid evaporation
CTION 12. ECOLOGICAL IN	NFORMATION	
Biodegradability		
Difluoromethane	: Note: Minimal	
Pentafluoroethane	: Result: Not readily biodegradable. Value: 5 % Method: OECD 301 D	
	cology	
Further information on e		
Further information on en Additional ecological information	This product is subject to U.S. Enviro Agency Clean Air Act Regulations at This product contains greenhouse ga to global warming. Do NOT vent to th with provisions of the U.S. Clean Air recovered.	40 CFR Part 82. ses which may contribute e atmosphere. To comply
Additional ecological information	Agency Clean Air Act Regulations at This product contains greenhouse ga to global warming. Do NOT vent to th with provisions of the U.S. Clean Air recovered.	40 CFR Part 82. ses which may contribute e atmosphere. To comply
Additional ecological	Agency Clean Air Act Regulations at This product contains greenhouse ga to global warming. Do NOT vent to th with provisions of the U.S. Clean Air recovered.	40 CFR Part 82. Ises which may contribute e atmosphere. To comply Act, any residual must be
Additional ecological information	Agency Clean Air Act Regulations at This product contains greenhouse ga to global warming. Do NOT vent to th with provisions of the U.S. Clean Air recovered. ISIDERATIONS : Observe all Federal, State, and Loca	40 CFR Part 82. Ises which may contribute e atmosphere. To comply Act, any residual must be

SAFETY DATA SHEET			Honeywell	
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ersion 2.0	R	evision Date 08/22/2018	Print Date 08/23/2018	
ECTION 14	TRANSPORT INFORMATIO	2N		
DOT	UN/ID No.	: UN 3163		
DOI	Proper shipping name	: LIQUEFIED GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, D Pentafluoroethane)	fluoromethane,	
	Class	2.2		
	Packing group Hazard Labels	2.2		
ΙΑΤΑ	UN/ID No.	: UN 3163		
	Description of the goods	: LIQUEFIED GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, D Pentafluoroethane)	ifluoromethane,	
	Class	: 2.2		
	Hazard Labels	: 2.2		
	Packing instruction (cargo	200		
	aircraft) Packing instruction	: 200		
	(passenger aircraft)	. 200		
IMDG	UN/ID No.	: UN 3163		
	Description of the goods	: LIQUEFIED GAS, N.O.S.		
	Class	DIFLUOROMETHANE, PEN 2.2	APLOURUEIHANE)	
	Hazard Labels	: 2.2		
	EmS Number	: F-C, S-V		
	Marine pollutant	: no		
ECTION 15	REGULATORY INFORMA	ΓΙΟΝ	,	
Inventor	ies			
US. Toxi Control A		SCA Inventory		
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## Genetron Performax® LT (R-407F)

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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. Existing Chemicals Inventory (KECI)	: 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 informa	tion	
SARA 302 Components	: No chemicals in this material are s requirements of SARA Title III, Sec	
SARA 313 Components	This material does not contain any known CAS numbers that exceed t reporting levels established by SAF	he threshold (De Minimis)
SARA 311/312 Hazards	: Sudden Release of Pressure Haza Acute Health Hazard	rd
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)329614	® LT (R-407F)	
rsion 2.0	Revision Date 08/22/2018	Print Date 08/23/201
California Prop. 65	isted below, known to the State of C birth defects or other reproductive ha to www.P65Warnings.ca.gov.	alifornia to cause cancer and
	Dichloromethane Chloromethane	75-09-2 74-87-3
Massachusetts RTK	: Dichloromethane	75-09-2
New Jersey RTK	: Difluoromethane	75-10-5
Pennsylvania RTK	: Difluoromethane	75-10-5
CTION 16. OTHER INFOR	MATION HMIS III NFPA	
Health hazard Flammability		
Health hazard	HMIS III         NFPA           1         2           1         1	
Health hazard Flammability Physical Hazard Instability	HMIS III NFPA 1 2 1 1 0 . 0 . 0 . 0 . 0 	ation is intended solely for the us
Health hazard Flammability Physical Hazard Instability Hazard rating and rating s of individuals trained in th <b>Further information</b> The information provided and belief at the date of it handling, use, processing warranty or quality specifi may not be valid for such unless specified in the tex	HMIS III NFPA 1 2 1 1 0 . 0 . 0 . 0 . 0 	est of our knowledge, informatio gned only as a guidance for safe ase and is not to be considered specific material designated and r materials or in any process, aterial is the sole responsibility
Health hazard Flammability Physical Hazard Instability Hazard rating and rating s of individuals trained in th <b>Further information</b> The information provided and belief at the date of it handling, use, processing warranty or quality specifi may not be valid for such unless specified in the tex the user. This information	HMIS III       NFPA         1       2         1       1         0       0         systems (e.g. HMIS® III, NFPA): This inform the particular system.         in this Safety Data Sheet is correct to the b s publication. The information given is design, storage, transportation, disposal and releaded and related and the information relates only to the sematerial used in combination with any other of the sematerial used in combination with any other of suitability of any material storem of suitability of any material s	est of our knowledge, information gned only as a guidance for safe ase and is not to be considered specific material designated and r materials or in any process, naterial is the sole responsibility specific product properties.

# Honeywell SAFETY DATA SHEET **Genetron Performax® LT (R-407F)** 10329614 Version 2.0 Revision Date 08/22/2018 Print Date 08/23/2018 Previous Issue Date: 09/28/2015 Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group Page 17 / 17

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Sid Harvey item # R407FX25, R407FX115

SDS# Z0485

ersion 1.6		Revision Date 09/28/2015 Print Date 05/24/20
CTION 1. PRODUCT AND CO	OMF	PANY 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)
	:	
CTION 2. HAZARDS IDENTIF Emergency Overview	FICA	
CTION 2. HAZARDS IDENTIF Emergency Overview Form		TION
Emergency Overview		TION : Liquefied gas
Emergency Overview		TION
Emergency Overview Form Color	:	TION : Liquefied gas : clear and colourless : ether-like
Emergency Overview Form Color Odor Classification of the substa	ance	TION : Liquefied gas : clear and colourless : ether-like
Emergency Overview Form Color Odor Classification of the substand or mixture	: : ance ce	<ul> <li>TION</li> <li>Liquefied gas</li> <li>clear and colourless</li> <li>ether-like</li> <li>e or mixture</li> <li>Gases under pressure, Liquefied gas Simple Asphyxiant</li> </ul>
Emergency Overview Form Color Odor Classification of the substand or mixture	: : ance ce	TION Liquefied gas clear and colourless ether-like or mixture Gases under pressure, Liquefied gas

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rsion 1.6	Revision Date	09/28/2015	Print Date 05/24/2
Signal word	: Warning		
Hazard statements		nder pressure; may ex xygen and cause rapid	
Precautionary statements	: Storage: Protect from su	ınlight. Store in a well-v	ventilated place.
Hazards not otherwise classified		otbite. diac arrhythmia. e and skin irritation.	
Carcinogenicity			
No component of this produc anticipated carcinogen by NT	FP, IARC, or OSHA.		% is identified as a know
anticipated carcinogen by NT	FP, IARC, or OSHA. 	<b>REDIENTS</b> ,2-Tetrafluoroethane, F	
anticipated carcinogen by NT	<ul> <li>FP, IARC, or OSHA.</li> <li>FORMATION ON INGI</li> <li>: Mixture of 1,1,1</li> </ul>	<b>REDIENTS</b> ,2-Tetrafluoroethane, F	
anticipated carcinogen by NT CTION 3. COMPOSITION/INI Synonyms	FP, IARC, or OSHA. FORMATION ON INGI : Mixture of 1,1,1, Difluoromethand : Mixture	<b>REDIENTS</b> ,2-Tetrafluoroethane, F	
anticipated carcinogen by NT CTION 3. COMPOSITION/INF Synonyms Chemical nature	FP, IARC, or OSHA. FORMATION ON INGI : Mixture of 1,1,1, Difluoromethand : Mixture	<b>REDIENTS</b> ,2-Tetrafluoroethane, F ə	entafluoroethane and
anticipated carcinogen by NT CTION 3. COMPOSITION/INI Synonyms Chemical nature Chemical	FP, IARC, or OSHA. FORMATION ON INGI : Mixture of 1,1,1, Difluoromethand : Mixture	REDIENTS ,2-Tetrafluoroethane, F e CAS-No.	entafluoroethane and Concentration
anticipated carcinogen by NT CTION 3. COMPOSITION/INF Synonyms Chemical nature Chemical 1,1,1,2-Tetrafluoroethane	FP, IARC, or OSHA. FORMATION ON INGI : Mixture of 1,1,1, Difluoromethand : Mixture	REDIENTS ,2-Tetrafluoroethane, F e CAS-No. 811-97-2	Pentafluoroethane and Concentration 40.00 %

 Skin contact
 : After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm

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rsion 1.6	Revision Date 09/28/2015	Print Date 05/24/20
	(not hot) water. If water is not availal cloth or similar covering. If symptoms	
Eye contact	<ul> <li>Rinse immediately with plenty of wate for at least 15 minutes. In case of fro lukewarm, not hot. If symptoms persi</li> </ul>	stbite water should be
Ingestion	<ul> <li>Unlikely route of exposure. As this pr inhalation section. Do not induce von advice. Call a physician immediately.</li> </ul>	niting without medical
Notes to physician		
Treatment	Because of the possible disturbances catecholamine drugs, such as epiner special caution and only in situations Treatment of overexposure should be symptoms and the clinical conditions, needed.	ohrine, should be used with of emergency life support. e directed at the control of
CTION 5. FIREFIGHTING MEAS	SURES	
Oralitada la constitución de la la constitu		
Suitable extinguishing media	The product is not flammable. ASHRAE 34 Use water spray, alcohol-resistant fo carbon dioxide.	oam, dry chemical or
Suitable extinguishing media Specific hazards during firefighting	ASHRAE 34 Use water spray, alcohol-resistant fo	bient temperatures and ten mixed with air under tion sources. ire with water spray. n cause suffocation by hing.
Specific hazards during	<ul> <li>ASHRAE 34</li> <li>Use water spray, alcohol-resistant for carbon dioxide.</li> <li>This product is not flammable at am atmospheric pressure. However, this material can ignite which pressure and exposed to strong ignit Contents under pressure. Container may rupture on heating. Cool closed containers exposed to for Vapours are heavier than air and can reducing oxygen available for breath In case of fire hazardous decomposis produced such as: Hydrogen fluoride Carbon monoxide Carbon dioxide (CO2)</li> </ul>	bient temperatures and nen mixed with air under tion sources. ire with water spray. n cause suffocation by ning. ition products may be

SAFETY DATA SHEET		Honeywell
Genetron Performax LT 11.3kg/;	25lb Cyl	
00000013866		
Version 1.6	Revision Date 09/28/2015	Print Date 05/24/2018
SECTION 6. ACCIDENTAL RELE	ASE MEASURES	
Personal precautions	<ul> <li>Wear personal protective equipment. Immediately evacuate personnel to s Keep people away from and upwind of Remove all sources of ignition. Avoid skin contact with leaking liquid Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can reducing oxygen available for breathi Avoid accumulation of vapours in low Unprotected personnel should not rel tested and determined safe. Ensure that the oxygen content is &gt;=</li> </ul>	afe areas. of spill/leak. (danger of frostbite). cause suffocation by ng. vareas. turn until air has been
Environmental precautions	: Prevent further leakage or spillage if The product evapourates readily.	safe to do so.
Methods for cleaning up	: Ventilate the area.	
ECTION 7. HANDLING AND ST Handling Handling Advice on protection against fire and explosion	<ul> <li>ORAGE</li> <li>Wear personal protective equipment. Do not breathe vapour. Avoid contact with skin, eyes and clot Follow all standard safety precautions compressed gas cylinders. Keep away from heat. Use authorized cylinders only. Protect cylinders from physical dama Do not puncture or drop cylinders, exp excessive heat. Do not pierce or burn, even after use. flame or any incandescent material. Do not remove screw cap until immed Always replace cap after use.</li> <li>The product is not flammable. Can form a combustible mixture with atmospheric pressure.</li> </ul>	s for handling and use of ge. bose them to open flame or Do not spray on a naked liately ready for use.
Storage		

(25lb Cyl	n system (Nysteries) och system i system i steriet at state at state och
Revision Date 09/28/2015	Print Date 05/24/201
<ul> <li>Pressurized container: protect to temperatures exceeding 50 after use.</li> <li>Keep containers tightly closed place.</li> <li>Storage rooms must be prope Ensure adequate ventilation, etc.</li> </ul>	from sunlight and do not expose °C. Do not pierce or burn, even in a dry, cool and well-ventilated rly ventilated. especially in confined areas.
ROLS/PERSONAL PROTECTION	
	and clothing. and safety showers are close to
	lequate for storage and handling. at stations with exhaust
If splashes are likely to occur,	wear:
Protective gloves Neoprene gloves	-
equipment. Wear a positive-pressure sup Vapours are heavier than air a reducing oxygen available for For rescue and maintenance v	plied-air respirator. and can cause suffocation by breathing. work in storage tanks use
practice. Ensure adequate ventilation, e Do not get in eyes, on skin, or Remove and wash contamina	on clothing. ted clothing before re-use.
	<ul> <li>to temperatures exceeding 50 after use.</li> <li>Keep containers tightly closed place.</li> <li>Storage rooms must be prope Ensure adequate ventilation, e Protect cylinders from physica</li> <li><b>ROLS/PERSONAL PROTECTION</b></li> <li>Do not breathe vapour.</li> <li>Avoid contact with skin, eyes a Ensure that eyewash stations the workstation location.</li> <li>General room ventilation is ad Perform filling operations only ventilation facilities.</li> <li>Wear as appropriate:</li> <li>Safety glasses with side-shield If splashes are likely to occur, Goggles or face shield, giving</li> <li>Leather gloves In case of contact through spla Protective gloves Neoprene gloves Polyvinyl alcohol or nitrile- but</li> <li>Avoid skin contact with leaking Wear cold insulating gloves/ face and maintenance with goves are heavier than air a reducing oxygen available for For rescue and maintenance wiself-contained breathing appa</li> <li>Handle in accordance with goves</li> </ul>

# Honeywell

sion 1.6 Exposure Guidelir		Revision Date	0012012010	,	Print Date 05/24
Components	CAS-No.	Value	Control parameters	Upda te	Basis
1,1,1,2-Tetrafluor oethane	811-97-2	TWA : Time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluor	811-97-2	T14/A	1 4 0 4 0		1
oethane	811-97-2	TWA : Time weighted average	4,240 mg/m3 (1,000 ppm)	2007	WEEL:US. OARS. WEELs Workplace Environmental Exposure Level Guide
Pentafluoroethan	254 22 6		(1.000		T
e	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.
TION 9. PHYSICAL		L PROPERTI	ES		
color	: cle	ear and coloui	rless		
dor	: ett	ner-like			
Н	: No	ote: neutral			
oiling point/boiling r	ange : -4	5.5 °C at 1,01	13 hPa		

# Honeywell

rsion 1.6	Revision Date 09/28/2015	Print Date 05/24/2
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-1 log Pow: 1.48	34a)
	Note: Ethane, pentafluoro- (HFC-125)	
Ignition temperature	: Note: no data available	
CTION 10. STABILITY AND		
Chemical stability	: Stable under normal conditions	
Possibility of hazardous reactions Conditions to avoid	<ul> <li>Hazardous polymerisation does not occ</li> <li>Pressurized container. Protect from sur to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosiv decomposition products. Can form a combustible mixture with ai atmospheric pressure.</li> </ul>	nlight and do not expose re and toxic

# Honeywell

rsion 1.6	Revision Date 09/28/2015 Print Date 05/24/20
	Do not mix with oxygen or air above atmospheric pressure.
Incompatible materials to avoid	: Potassium Calcium Powdered metals Finely divided aluminium Finely divided magnesium Zinc
Hazardous decomposition products	<ul> <li>In case of fire hazardous decomposition products may be produced such as: Gaseous hydrogen fluoride (HF). Carbonyl halides Carbon monoxide Carbon dioxide (CO2)</li> </ul>
CTION 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	
Pentafluoroethane Sensitisation 1,1,1,2-Tetrafluoroethane	Species: Rat > 769000 ppm Exposure time: 4 h
Sensitisation	Species: Rat > 769000 ppm Exposure time: 4 h Species: Rat : Cardiac sensitization Species: dogs Note: No-observed-effect level 50 000 ppm Lowest observed effect level

# Honeywell

sion 1.6	Revision Date 09/28/2015	Print Date 05/24/20
	75 000 ppm Lowest observed effect level 100 000 ppm	, THE DOLD COLL
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 mutage	enic 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 mammali	ian cytogenetic test)
	: Test Method: Chromosome aberration Result: negative	test in vitro
	: Cell type: Human lymphocytes Result: negative	
	: Cell type: Chinese Hamster Ovary Cells Result: negative	5
Genotoxicity in vivo Difluoromethane	о : ма <sub></sub>	
Diluoromenane	: Species: Mouse Cell type: Bone marrow Method: Mutagenicity (micronucleus tes Result: negative	st)

SAFETY DATA SHEET	Honeywell
enetron Performax LT 11.3kg/ 00000013866 ersion 1.6	25lb Cyl Revision Date 09/28/2015 Print Date 05/24/201
Teratogenicity Difluoromethane	<ul> <li>Species: Rat</li> <li>Dose: NOEL - 50,000 ppm</li> <li>Note: Did not show teratogenic effects in animal experiments.</li> </ul>
	Species: Rabbit Dose: NOEL - 50,000 ppm Note: Did not show teratogenic effects in animal experiments.
Pentafluoroethane	<ul> <li>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.</li> </ul>
	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.
CTION 12. ECOLOGICAL INFO	DRMATION
Biodegradability Difluoromethane	: Note: Minimal
Pentafluoroethane	: Result: Not readily biodegradable. Value: 5 % Method: OECD 301 D
Further information on ecol	ogy
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.

ersion 1.6	R	evision Date 09/28/2015 Print Date 05/24/207
CTION 13	. DISPOSAL CONSIDERATI	ONS
Disposa	I methods : Ob reg	serve all Federal, State, and Local Environmental ulations.
Note	Cle	is product is subject to U.S. Environmental Protection Agency ean Air Act Regulations Section 608 in 40 CFR Part 82 parding refrigerant recycling.
CTION 14	. TRANSPORT INFORMATIO	DN
DOT	UN/ID No. Proper shipping name	<ul> <li>UN 3163</li> <li>LIQUEFIED GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, Difluoromethane, Pontafluoroethane)</li> </ul>
	Class Packing group Hazard Labels	Pentafluoroethane) 2.2 2.2
ΙΑΤΑ	UN/ID No. Description of the goods	<ul> <li>UN 3163</li> <li>LIQUEFIED GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, Difluoromethane,</li> </ul>
	Class Hazard Labels Packing instruction (cargo	Pentafluoroethane) 2.2 2.2 200
	aircraft) Packing instruction (passenger aircraft)	: 200
IMDG	UN/ID No. Description of the goods	<ul> <li>: UN 3163</li> <li>: LIQUEFIED GAS, N.O.S. (1,1,1,2-TETRAFLUOROETHANE, DIFLUOROMETHANE, PENTAFLUOROETHANE)</li> </ul>
	Class Hazard Labels EmS Number Marine pollutant	2.2 2.2 F-C, S-V no

# Honeywell

fersion 1.6	Revision Date 09/28/2015 Print Date 05/24/201
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 informa	tion
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

SAFETY DATA SHE	ET	Honeywell
Genetron Performax LT 11.3 000000013866 Version 1.6 California Prop. 65	Revision Date 09/28	3/2015 Print Date 05/24/2010 ct contains a chemical known to the State
	of California to cause c Dichloromethane	ancer. 75-09-2
	: WARNING: This produce of California to cause b Chloromethane	ct contains a chemical known to the State irth defects or other reproductive harm. 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 of the CPR and the MSI by the CPR.	classified according to the hazard criteria DS contains all of the information required

## SECTION 16. OTHER INFORMATION

Health hazard	HMIS III : 1	NFPA 2
Flammability	: 1	1
Physical Hazard Instability	: 0 :	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 to be considered a

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SAFETY DATA SHEET	Honeywell
Genetron Performax LT 11.3kg/25lb Cyl	
00000013866	
Version 1.6 Revision Date 0	9/28/2015 Print Date 05/24/2010
warranty or quality specification. The information rela may not be valid for such material used in combination unless specified in the text. Final determination of su the user. This information should not constitute a gua	ates only to the specific material designated and on with any other materials or in any process, itability of any material is the sole responsibility of
Changes since the last version are highlighted in the versions. Previous Issue Date: 06/04/2014	margin. This version replaces all previous
Prepared by Honeywell Performance Materials and T	Technologies Product Stewardship Group
· · ·	
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SAFETY	DATA	SHEET	
according to	Regulatio	n (EC) No.	1907/2006

# Honeywell

Sid Harvey item # R407FX25

SDS # 20485

## Genetron Performax® LT (R-407F)

Version 2.2

Revision Date 24.11.2015

Supersedes 1

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

#### 1.1. Product identifier Product name : Genetron Performax® LT (R-407F) SDS-number 00000013866 : Type of product Mixture : Remarks SDS according to Art. 31 of Regulation (EC) 1907/2006. : 1.2. Relevant identified uses of the substance or mixture and uses advised against Use of the Refrigerant : Substance/Mixture Uses advised against : none 1.3. Details of the supplier of the safety data sheet Company Honeywell Fluorine Products Honeywell International, Inc. : 115 Tabor Road Europe B.V. Laarderhoogtweg 18 Morris Plains, NJ 07950-2546 1101 EA Amsterdam USA Netherlands (31) 020 5656911 Telephone : Telefax : (31) 020 5656600 For further information, : PMTEU Product Stewardship: please contact: SafetyDataSheet@Honeywell.com 1.4. Emergency telephone number Emergency telephone : (32) 16 391 209 (Mon-Fri, 9.00-17.00h) +1-703-527number 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

Hazard pictograms



Signal word

: Warning

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# Honeywell

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

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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

Contains gas under pressure; may explode if heated.

#### SECTION 3: Composition/information on ingredients

#### 3.1. Substance

Not applicable

#### 3.2. Mixture

Chemical Name	CAS-No. Index-No. Registration number EC-No.	Classification 1272/2008	Concentration	Remarks
Norflurane (Active ingredient)	811-97-2 01-2119459374-33 212-377-0	Press. Gas ; H280	>= 25 - < 50	1*
Pentafluoroethane (Active ingredient)	354-33-6 01-2119485636-25 206-557-8	Press. Gas ; H280	>= 25 - < 50	1*
Difluoromethane (Active ingredient)	75-10-5 01-2119471312-47 200-839-4	Flam. Gas 1; H220 Press. Gas ; H280	>= 25 - <= 50	1*

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

Remaining components of this product are non-hazardous and/or are present at concentrations below reportable limits.

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. Page 2 / 13 SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

# Honeywell

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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:

Rapid evaporation of the liquid may cause frostbite. In case of contact with liquid, thaw frosted parts with water, then remove clothing carefully. Wash with plenty of water Consult a physician. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use.

#### Eye contact:

Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

#### Ingestion:

Ingestion is unlikely because of the physical properties and is not expected to be hazardous.

#### 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.

#### 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.

# Honeywell

## Genetron Performax® LT (R-407F)

Version 2.2

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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 evapourates readily.

#### 6.3. Methods and materials for containment and cleaning up

Ventilate the area.

#### 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.

Hygiene measures:

Provide adequate ventilation. When using do not eat or drink.

#### 7.2. Conditions for safe storage, including any incompatibilities

#### Further information on storage conditions:

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)

no additional data available

# Honeywell

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

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#### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

#### Occupational exposure limits:

Components	Basis / Value type	Value / Form of exposure	Exceeding Factor	Remarks
Norflurane	HONEY WELL TWA	1.000 ppm		
Norflurane	EH40 WEL TWA	4.240 mg/m3 1.000 ppm		
Pentafluoroethane	HONEY WELL TWA	1.000 ppm		We are not aw are of any national exposure limit.

TWA - Time w eighted average

#### **DNEL/ PNEC-Values**

Component	End-use / Impact	Exposure duration	Value	Exposure routes	Remarks
Norflurane	Workers / Long-term systemic effects		13936 mg/m3	Inhalation	
Norflurane	Consumers / Long-term systemic effects		2476 mg/m3	Inhalation	
Difluoromethane	Workers / Long-term systemic effects		7035 mg/m3	Inhalation	
Difluoromethane	Consumers / Long-term systemic effects		750 mg/m3	Inhalation	
Pentafluoroethane	Workers / Long-term systemic effects		16444 mg/m3	Inhalation	
Pentafluoroethane	Consumers / Long-term systemic effects		1753 mg/m3	Inhalation	

Component	Environmental compartment / Value	Remarks
Norflurane	Fresh w ater: 0,1 mg/l	Assessment factor: 1000

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Norflurane	Marine water: 0,01 mg/l	Assessment factor: 10000
Norflurane	Fresh w ater sediment: 0,75 mg/kg	Assessment factor: 100
Norflurane	Sew age treatment plant: 73 mg/l	Assessment factor: 10
Difluoromethane	Fresh water: 0,142 mg/l	Assessment factor: 1000
Difluoromethane	Fresh w ater sediment: 0,534 mg/kg dw	
Pentafluoroethane	Fresh w ater: 0,1 mg/l	Assessment factor: 1000
Pentafluoroethane	Fresh w ater sediment: 0,6 mg/kg dw	

#### 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: Protective gloves against cold (EN 511)

*Eye protection:* Safety glasses with side-shields conforming to EN166 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	: clear and	

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		colourless
Odour	:	ether-like
	:	no data available
Boiling point/boiling range	:	-45,5 °C at 1.013 hPa
Ignition temperature	:	no data available
Lower explosion limit	:	None
Upper explosion limit	:	None
Vapour pressure	:	10.218 hPa at 21,1 °C
Density	:	no data available
pH	:	neutral
Water solubility	:	no data available
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 Ethane, pentafluoro- (HFC-125)
Relative vapour density	:	not determined
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

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

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#### 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.

#### 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: no data available

Acute dermal toxicity: no data available

Acute inhalation toxicity: LC50 Species: Rat Value: > 500000 ppm Exposure time: 4 h Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)

LC50

Species: Rat Value: 520000 ppm Exposure time: 4 h Test substance: Difluoromethane (HFC-32)

LC50 Species: Rat Value: > 769000 ppm Exposure time: 4 h Test substance: Ethane, pentafluoro- (HFC-125)

Skin irritation: no data available

*Eye irritation:* no data available

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Respiratory or skin sensitisation: Cardiac sensitization Species: dogs Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) No-observed-effect level 50 000 ppm Lowest observed effect level 75 000 ppm

Cardiac sensitization Species: dogs Test substance: Difluoromethane (HFC-32) No-observed-effect level >350 000 ppm

Cardiac sensitization Species: dogs Test substance: Ethane, pentafluoro- (HFC-125) No-observed-effect level 75 000 ppm Lowest observed effect level 100 000 ppm

Repeated dose toxicity: Species: Rat Application Route: Inhalation NOAEL: 50000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) Note: Subchronic toxicity

Species: Rat NOAEL: 10000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) Note: Chronic toxicity

Species: Rat Application Route: Inhalation NOAEL: 50000 ppm Test substance: Difluoromethane (HFC-32) Note: Subchronic toxicity

Species: Rat Application Route: Inhalation NOAEL>=: 50000 ppm Test substance: Ethane, pentafluoro- (HFC-125) Note: Subchronic toxicity

*Germ cell mutagenicity:* Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) Note: In vitro tests did not show mutagenic effects

Test substance: Difluoromethane (HFC-32) Note: In vitro tests did not show mutagenic effects

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#### SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

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

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Test substance: Ethane, pentafluoro- (HFC-125) Note: In vitro tests did not show mutagenic effects

Aspiration hazard: no data available

Other information: Inhalation: May cause cardiac arrhythmia.

#### **SECTION 12: Ecological information**

#### 12.1. Toxicity

*Toxicity to fish:* no data available

*Toxicity to aquatic plants:* no data available

*Toxicity to Microorganisms:* no data available

*Toxicity to aquatic invertebrates:* no data available

#### 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.Classification: 14.06.01

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*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		0400
UN Number Description of the goods	:	3163 LIQUEFIED GAS, N.O.S. (1,1,1,2-TETRAFLUOROETHANE, DIFLUOROMETHANE, PENTAFLUOROETHANE)
Class	:	2
Classification Code	:	2A
Hazard Identification Number	:	20
ADR/RID-Labels	:	2.2
Environmentally hazardous	:	no
ΙΑΤΑ		
UN Number		3163
Description of the goods	:	
Description of the goods	•	Liquefied gas, n.o.s. (1,1,1,2-Tetrafluoroethane, Difluoromethane, Pentafluoroethane)
Class	:	2.2
Hazard Labels	:	2.2
IMDG		
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
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 SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

# Honeywell

### Genetron Performax® LT (R-407F)

Version 2.2

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Supersedes 1

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

#### 15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out.

#### **SECTION 16: Other information**

Text of H-statements referre	d to under heading 3	
Norflurane	: H280	Contains gas under pressure; may explode if heated.
Pentafluoroethane	: H280	Contains gas under pressure; may explode if heated.
Difluoromethane	: H220 H280	Extremely flammable gas. 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.

Abreviations: EC European Community CAS Chemical Abstracts Service DNEL Derived no effect level PNEC Predicted no effect level vPvB Very persistent and very biaccumulative substance PBT Persistent, bioaccmulative und toxic substance

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Supersedes 1

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.

Material Safet	y Data Sheet
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Version 1		Revision Date 01/28/2010	Print Date 04/15/2011
SECTION 1. PRODUCT AND C	OMP	ANY IDENTIFICATION	
Product name MSDS Number Product Use Description	:	Genetron Performax™ LT 00000013866 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- (24 hours/day, 7 days/week)	527-3887

#### 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.
Eyes	: Causes serious eye irritation. May cause frostbite.
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sion 1	Revision Date 01/28/2010		Print Date 04/15/2
Ingestion	: Unlikely route of exposure. Effects due to ingestion may Gastrointestinal discomfort	include:	
Inhalation	: Gas reduces oxygen availab Causes asphyxiation in high not realize that he/she is suff Inhalation may cause central Vapours may cause drowsin Effects of breathing high con include: Cardiac arrhythmias	concentrations. focating. I nervous system ess and dizzines	effects. s.
Chronic Exposure	: None known.		
Carcinogenicity			
or anticipated carcinoge	oduct present at levels greater than or e n by NTP, IARC, or OSHA.	qual to 0.1% is i	dentified as a know
TION 3. COMPOSITIO	N/INFORMATION ON INGREDIENTS		
Component	N/INFORMATION ON INGREDIENTS	CAS-No.	Weight percent
	N/INFORMATION ON INGREDIENTS	CAS-No. 811-97-2	Weight percent 40.00
Component	N/INFORMATION ON INGREDIENTS		
Component Norflurane	N/INFORMATION ON INGREDIENTS	811-97-2	40.00
Component Norflurane Difluoromethane Pentafluoroethane		811-97-2 75-10-5	40.00 30.00
Component Norflurane Difluoromethane		811-97-2 75-10-5 354-33-6 is irregular or str . Use oxygen as is present. Call a	40.00 30.00 30.00 sopped, required, physician. Do
Component Norflurane Difluoromethane Pentafluoroethane	ASURES : Move to fresh air. If breathing administer artificial respiration provided a qualified operator	811-97-2 75-10-5 354-33-6 is irregular or str b. Use oxygen as is present. Call a e-ephedrine grou immediately with e, bathe (do not r vater is not availi	40.00 30.00 30.00 srequired, physician. Do up. plenty of water. ub) with able, cover with a
Component Norflurane Difluoromethane Pentafluoroethane <b>TION 4. FIRST AID ME</b>	<ul> <li>ASURES</li> <li>Move to fresh air. If breathing administer artificial respiration provided a qualified operator not give drugs from adrenaline</li> <li>After contact with skin, wash i If there is evidence of frostbite lukewarm (not hot) water. If v clean, soft cloth or similar cov</li> </ul>	811-97-2 75-10-5 354-33-6 is irregular or str b. Use oxygen as is present. Call a e-ephedrine grou immediately with e, bathe (do not r vater is not availa vering. If symptor of water, also u e of frostbite wat	40.00 30.00 30.00 30.00 ppped, required, physician. Do up. plenty of water. rub) with able, cover with a ns persist, call a nder the eyelids, rer should be

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sion 1	Revision Date 01/28/2010	Print Date 04/15/
	advice. Call a physician immediatel	у.
Notes to physician		
Treatment	: Because of the possible disturbance catecholamine drugs, such as epine with special caution and only in situ support. Treatment of overexposur control of symptoms and the clinica bitten areas as needed.	ephrine, should be used ations of emergency life e should be directed at the
TION 5. FIRE-FIGHTING ME	ASURES	
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 f carbon dioxide.	oam, dry chemical or
Specific hazards during fire fighting	<ul> <li>This product is not flammable at am atmospheric pressure. However, this material can ignite wh pressure and exposed to strong ign Contents under pressure. Container may rupture on heating. Cool closed containers exposed to vapours are heavier than air and careducing oxygen available for breat In case of fire hazardous decompose produced such as: Hydrogen fluoride Carbon monoxide Carbon dioxide (CO2) Carbonyl halides</li> </ul>	nen mixed with air under ition sources. fire with water spray. an cause suffocation by hing.
Special protective equipment for fire-fighters	: Wear self-contained breathing appa : Use extinguishing measures that ar	

### SECTION 6. ACCIDENTAL RELEASE MEASURES

ersion 1		Revision Date 01/28/2010	Print Date 04/15/2011
Personal precautions	:	Wear personal protective equipment. Immediately evacuate personnel to sa Keep people away from and upwind of Remove all sources of ignition. Avoid skin contact with leaking liquid Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can reducing oxygen available for breathin Avoid accumulation of vapours in low Unprotected personnel should not ret tested and determined safe. Ensure that the oxygen content is >=	of spill/leak. (danger of frostbite). cause suffocation by ng. areas. aurn until air has been
Environmental precautions	:	Prevent further leakage or spillage if a The product evaporates readily.	safe to do so.
Methods for cleaning up	:	Ventilate the area.	
ECTION 7. HANDLING AND ST	OF	AGE	
Handling			
Handling	:	Wear personal protective equipment. Do not breathe vapour. Avoid contact with skin, eyes and clot Follow all standard safety precautions compressed gas cylinders. Keep away from heat. Use authorized cylinders only. Protect cylinders from physical dama. Do not puncture or drop cylinders, ex or excessive heat. Do not pierce or burn, even after use. flame or any incandescent material. Do not remove screw cap until immed Always replace cap after use.	thing. s for handling and use of ge. pose them to open flame . Do not spray on a naked
Advice on protection against fire and explosion	:	The product is not flammable. Can form a combustible mixture with atmospheric pressure.	air at pressures above
Storage			
Requirements for storage areas and containers	:	Pressurized container: Protect from s to temperatures exceeding 50 °C. Do after use. Keep containers tightly closed in a dr place. Storage rooms must be properly vent	not pierce or burn, even y, cool and well-ventilated
		Page 4 / 5	

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Enetron Performax LT 13.3kg/25lb Cyl         rsion 1       Revision Date 01/28/2010       Print Date         Ensure adequate ventilation, especially in confined are Protect cylinders from physical damage.       Contact cylinders from physical damage.         CTION 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 of the workstation location.         Engineering measures       :       General room ventilation is adequate for storage and h 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 ere thand protection         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 frostbil Wear cold insulating gloves/face shield/eye protection.         Respiratory protection       :       In case of insufficient ventilation wear suitable respirator. Wear a positive-pressure supplied-air respirator. Wear a positive-pressure supplied-air respirator.         Wear a positive-pressure supplied-air respirator. Wear a positive-pressure supplied-air respirator. Wear a positive-pressure supplied-air respirator.         Waption Breathing apparatus.	••
Ensure adequate ventilation, especially in confined are Protect cylinders from physical damage.         CTION 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 of the workstation location.         Engineering measures       : General room ventilation is adequate for storage and h 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 er         Hand protection       : Leather gloves In case of contact through splashing: Protective gloves Polyvinyl alcohol or nitrile- butyl-rubber gloves         Skin and body protection       : Avoid skin contact with leaking liquid (danger of frostbil Wear cold insulating gloves/face shield/eye protection.         Respiratory protection       : In case of insufficient ventilation wear suitable respirator. Vapours are heavier than air and can cause suffocation reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use contained breathing apparatus.         Hygiene measures       : Handle in accordance with good industrial hygiene and practice.	
Protect cylinders from physical damage.         CTION 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 of the workstation location.         Engineering measures       :       General room ventilation is adequate for storage and h 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 er 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 frostbil Wear cold insulating gloves/face shield/eye protection.         Respiratory protection       :       In case of insufficient ventilation wear suitable respirator. Vapours are heavier than air and can cause suffocation reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use contained breathing apparatus.         Hygiene measures       :       Handle in accordance with good industrial hygiene and practice.	e 04/15/20
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Avoid contact with skin, eyes and clothing. Ensure that eyewash stations and safety showers are of the workstation location.Engineering measures:General room ventilation is adequate for storage and h 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 erHand protection:Leather gloves In case of contact through splashing: Protective gloves Neoprene gloves Polyvinyl alcohol or nitrile- butyl-rubber glovesSkin and body protection:Avoid skin contact with leaking liquid (danger of frostbil Wear cold insulating gloves/face shield/eye protection.Respiratory protection:In case of insufficient ventilation wear suitable respirator. Vapours are heavier than air and can cause suffocation reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use contained breathing apparatus.Hygiene measures:Handle in accordance with good industrial hygiene and practice.	
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Safety glasses with side-shields If splashes are likely to occur, wear: Goggles or face shield, giving complete protection to endHand protection: Leather gloves In case of contact through splashing: Protective gloves Neoprene gloves Polyvinyl alcohol or nitrile- butyl-rubber glovesSkin and body protection: Avoid skin contact with leaking liquid (danger of frostbill Wear cold insulating gloves/face shield/eye protection.Respiratory protection: In case of insufficient ventilation wear suitable respirator equipment. Wear a positive-pressure supplied-air respirator. Vapours are heavier than air and can cause suffocation reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use contained breathing apparatus.Hygiene measures: Handle in accordance with good industrial hygiene and practice.	andling.
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<ul> <li>equipment. Wear a positive-pressure supplied-air respirator. Vapours are heavier than air and can cause suffocation reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use contained breathing apparatus.</li> <li>Handle in accordance with good industrial hygiene and practice.</li> </ul>	e).
practice.	ט by
Do not get in eyes, on skin, or on clothing. Remove and wash contaminated clothing before re-use Keep working clothes separately.	as.
Exposure Guidelines	
1,1,1,2- 811-97-2 WEEL TWA 1,000 ppm Tetrafluoroethane	4,240 mg/m3
HONEYWELL TWA 1,	000 ppm

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## Genetron Performax LT 13.3kg/25lb Cyl

ersion 1	Re	evision Date 01/2	8/2010	Print Dat	e 04/15/20
Difluoromethane	75-10-5	WEEL	TWA	1,000 ppm	2,200 mg/m3
		HONEYWELL	TWA	1,0	000 ppm
Pentafluoroethane	354-33-6	WEEL	TWA	1,000 ppm	4,900 mg/m3
		HONEYWELL	TWA	1,(	000 ppm
CTION 9. PHYSICAL AND	CHEMICAL	PROPERTIES			
Form	: Liqi	uefied gas			
Color	: clea	ar and colourless			
Odor	: eth	er-like			
рН	: neu	itral			
Boiling point/boiling range		.5 °C (-49.9 °F) ,013 hPa			
Vapor pressure		218 hPa 21.1 °C (70.0 °F)			
Vapor pressure		621 hPa 64.4 °C (129.9 °F)	)		
Relative vapour density	: not	determined			
Density	: not	determined			
Partition coefficient: n- octanol/water	: log	Pow: 1.06			
octano/water	1,1	1,2-tetrafluoroeth	iane (HFC-134a)		
Partition coefficient: n- octanol/water	: log	Pow: 1.48			
octanol/water	Ethane, pentafluoro- (HFC-125)				
CTION 10. STABILITY AN	D REACTIVI	ТҮ			
Conditions to avoid	exp Dec Sor	ose to temperatu composes under	er. Protect from sun tres exceeding 50 ° high temperature. xpected of corrosive ucts.	Ċ.	ot

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## Genetron Performax LT 13.3kg/25lb Cyl

Materials to avoid Hazardous decomposition products Hazardous reactions		Can form a combustible mixture with a atmospheric pressure. Do not mix with oxygen or air above a Finely divided aluminium Potassium Calcium Powdered metals Aluminium Magnesium Zinc In case of fire hazardous decomposition produced such as: Gaseous hydrogen fluoride (HF). Carbonyl halides Carbon monoxide Carbon dioxide (CO2)	tmospheric pressure.
Hazardous decomposition products		Potassium Calcium Powdered metals Aluminium Magnesium Zinc In case of fire hazardous decomposition produced such as: Gaseous hydrogen fluoride (HF). Carbonyl halides Carbon monoxide	on products may be
products		produced such as: Gaseous hydrogen fluoride (HF). Carbonyl halides Carbon monoxide	on products may be
Hazardous reactions			
	•	Hazardous polymerisation does not or Stable under normal conditions.	ccur.
TION 11. TOXICOLOGICAL IN	NF	ORMATION	
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-tetrafluoroetha	ne (HFC-134a)
Acute inhalation toxicity	:	LC50 rat Dose: 520000 ppm Exposure time: 4 h Test substance: Difluoromethane (HFC	2-32)
Acute inhalation toxicity	:	LC50 rat Dose: > 769000 ppm Exposure time: 4 h Test substance: Ethane, pentafluoro- (l	HFC-125)
Skin irritation	:	no data available	
Eye irritation	:	no data available	
Sensitisation	:	Cardiac sensitization dogs Test substance: 1,1,1,2-tetrafluoroetha No-observed-effect level	ne (HFC-134a)

interview control intervi

## Genetron Performax LT 13.3kg/25lb Cyl

Version 1     Revision Date 01/28/2010     Print Date 04/15/2011       50,000 ppm     Lowest observable effect level 75,000 ppm     Sensitisation     : Cardiac sensitization dogs Test substance: Diflucromethane (HFC-32) No-observat-effect level >360,000 ppm       Sensitisation     : Cardiac sensitization dogs Test substance: Ethane, pentafluoro- (HFC-125) No-observat-effect level 75,000 ppm       Sensitisation     : Cardiac sensitization dogs Test substance: Ethane, pentafluoro- (HFC-125) No-observat-effect level 100,000 ppm       Repeated dose toxicity     : Inhalation rat Subchronic toxicity NOEL: 50000 ppm       Repeated dose toxicity     : rat Chronic toxicity NOEL: 50000 ppm       Repeated dose toxicity     : Inhalation rat Subchronic toxicity NOEL: 50000 ppm       Repeated dose toxicity     : Inhalation rat Subchronic toxicity NOEL: 50000 ppm       Repeated dose toxicity     : Inhalation rat Subchronic toxicity NOEL: 50000 ppm       Repeated dose toxicity     : Inhalation rat Subchronic toxicity NOEL: 50000 ppm       Repeated dose toxicity     : Inhalation rat Subchronic toxicity NOEL: >= 50000 ppm       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: 2filuoromethane (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       Test substance: 2filuoromethane (HFC-134a) NOEL - 40,000 ppm		- 1	• •	
Lowest observable offoct level         75,000 ppm         Sensitisation       : Cardiac sensitization dogs         Test substance: Diffuoromethane (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         76,000 ppm         Repeated dose toxicity         :       Inhalation rat Subchronic toxicity         NOEL:       100,000 ppm         Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)         Repeated dose toxicity       :         :       rat Subchronic toxicity         NOEL:       50000 ppm         Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)         Repeated dose toxicity       :         :       Inhalation rat Subchronic toxicity         NOEL:       50000 ppm         Test substance: Ethane, pentafluoro- (HFC-125)         Genotoxicity in vitro       :         :       Inhalation rat Subchronic toxicity         NOEL:       50000 ppm         Test substance: Ethane, pentafluoro- (HFC-125)         Genotoxicity in vitro <td< td=""><td>Version 1</td><td></td><td>Revision Date 01/28/2010</td><td>Print Date 04/15/2011</td></td<>	Version 1		Revision Date 01/28/2010	Print Date 04/15/2011
Test substance: Diffuoromethane (HFC-32) No-observed-effect level >350,000 ppm         Sensitisation       : Cardiac sensitization dogs Test substance: Ethane, pentafluoro- (HFC-125) No-observed-effect level 100,000 ppm Lowest observable effect level 100,000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)         Repeated dose toxicity       : Inhalation rat Subchronic toxicity NOEL: 50000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)         Repeated dose toxicity       : Inhalation rat Subchronic toxicity NOEL: 50000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)         Repeated dose toxicity       : Inhalation rat Subchronic toxicity NOEL: 50000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)         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: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effects         Genotoxicity in vitro       : Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm         Teratogenicity       : rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm         Teratogenicity       : rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm			Lowest observable effect level	
Test substance: Ethane, pentafluoro- (HFC-125) No-observed-effect level 75,000 ppm Lowest observable effect level 100,000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)         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: 50000 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         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: 1,1,1,2-tetrafluoroethane (HFC-134a) NoEL - 40,000 ppm         Teratogenicity       : rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm         Teratogenicity       : rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm	Sensitisation	:	Test substance: Difluoromethane (HFC No-observed-effect level	C-32)
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: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effects         Genotoxicity in vitro       : Test substance: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effects         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       : rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm         Teratogenicity       : rat Test substance: 0:filuoromethane (HFC-32) NOEL - 40,000 ppm	Sensitisation	:	Test substance: Ethane, pentafluoro- (I No-observed-effect level 75,000 ppm Lowest observable effect level	HFC-125)
NOEL:10000 ppm Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)Repeated dose toxicity:Inhalation rat Subchronic toxicity NOEL:Source:Repeated dose toxicity:Inhalation rat Subchronic toxicity NOEL: >= 50000 ppm Test substance: Ethane, pentafluoro- (HFC-125)Genotoxicity in vitro:Test substance: Ethane, pentafluoro- (HFC-134a) In vitro tests did not show mutagenic effectsGenotoxicity in vitro:Test substance: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effectsGenotoxicity in vitro:Test substance: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effectsGenotoxicity in vitro:Test substance: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effectsGenotoxicity in vitro:Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppmTeratogenicity:rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppmTeratogenicity:rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppmTeratogenicity:rat Test substance: Difluoromethane (HFC-32) NOEL - 50,000 ppm	Repeated dose toxicity	:	NOEL: 50000 ppm	ne (HFC-134a)
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:       1,1,2-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         Genotoxicity in vitro       :         Test substance:       Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effects         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       :         rat       Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm         Teratogenicity       :         rat       Test substance: Difluoromethane (HFC-32) NOEL - 50,000 ppm	Repeated dose toxicity	:	NOEL: 10000 ppm	ne (HFC-134a)
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 effectsGenotoxicity in vitro: Test substance: Difluoromethane (HFC-32) In vitro tests did not show mutagenic effectsGenotoxicity in vitro: Test substance: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effectsGenotoxicity in vitro: Test substance: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effectsTeratogenicity: rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppmTeratogenicity: rabbit Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppmTeratogenicity: rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppmTeratogenicity: rabbit Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppm	Repeated dose toxicity	:	NOEL: 50000 ppm	C-32)
In vitro tests did not show mutagenic effectsGenotoxicity in vitro: Test substance: Difluoromethane (HFC-32) In vitro tests did not show mutagenic effectsGenotoxicity in vitro: Test substance: Ethane, pentafluoro- (HFC-125) In vitro tests did not show mutagenic effectsTeratogenicity: rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppmTeratogenicity: rabbit Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppmTeratogenicity: rat Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) NOEL - 40,000 ppmTeratogenicity: rat Test substance: 0 ppmTeratogenicity: rat Test substance: 0 ppmTeratogenicity: rat Test substance: 0 ppmTeratogenicity: rat Test substance: 0 ppm	Repeated dose toxicity	:	NOEL: >= 50000 ppm	HFC-125)
In vitro tests did not show mutagenic effects         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       : 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	Genotoxicity in vitro	:		
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	Genotoxicity in vitro	:		
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	Genotoxicity in vitro	:		
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	:	Test substance: 1,1,1,2-tetrafluoroetha	ne (HFC-134a)
Test substance: Difluoromethane (HFC-32) NOEL - 50,000 ppm	Teratogenicity	:	Test substance: 1,1,1,2-tetrafluoroetha	ne (HFC-134a)
Page 8 / 12	Teratogenicity	:	Test substance: Difluoromethane (HFC	2-32)
			Page 8 / 12	

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### Genetron Performax LT 13.3kg/25lb Cyl

ersion 1	Revision Date 01/28/2010	Print Date 04/15/201
Teratogenicity	: rabbit Test substance: Difluoromethane NOEL - 50,000 ppm	e (HFC-32)
Teratogenicity	: rat Test substance: Ethane, pentaflu NOEL - 50,000 ppm	ioro- (HFC-125)
Teratogenicity	: rabbit Test substance: Ethane, pentaflu NOEL - 50,000 ppm	ioro- (HFC-125)
Additional advice	: Vapours are heavier than air and reducing oxygen available for bre Rapid evaporation of the liquid m May cause cardiac arrhythmia.	eathing.
CTION 12. ECOLOGICAL INF	ORMATION	
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		
Additional ecological	itional ecological : This product is subject to U.S. Environmental Protection	

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.
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#### SECTION 13. DISPOSAL CONSIDERATIONS

	Federal, State, and Local Environmental regulations. This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.
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## Genetron Performax LT 13.3kg/25lb Cyl

sion 1	Re	vision Date 01/28/2010	Print Date 04/15/2
TION 14.	TRANSPORT INFORMATIO	N	
DOT	UN-Number Proper shipping name Class Packing group Hazard Labels	: 3163 : LIQUEFIED GAS, N.O.S (1,1,1,2-Tetrafluoroethan Pentafluoroethane) 2.2 2.2	
IATA	UN Number Description of the goods	: 3163 : LIQUEFIED GAS, N.O.S (1,1,1,2-Tetrafluoroethan Pentafluoroethane)	
	Class Hazard Labels Packing instruction (cargo aircraft) Packing instruction (passenger aircraft)	: 2.2 : 2.2 : 200 : 200	
IMDG	Substance No. Description of the goods Class Hazard Labels EmS Number Marine pollutant	: UN 3163 : LIQUEFIED GAS, N.O.S (1,1,1,2-TETRAFLUORC DIFLUOROMETHANE, F : 2.2 : 2.2 : F-C : no	
TION 15.	REGULATORY INFORMATI	ON	
1907/200 US. Toxic Control A	to a p 1907/ c Substances : On T	nixture contains only ingredients re-registration according to Reg 2006 (REACH). SCA Inventory	
	l (Notification and	e inventory, or in compliance wit	h the inventory
Environm	nental Protection /A). Domestic	mponents of this product are on	the Canadian DSL list.
	ces List (DSL).		

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### Genetron Performax LT 13.3kg/25lb Cyl

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rsion 1	Revision Date 01/28/2010	Print Date 04/15/2011			
(Can. Gaz. Part II, Vol. 133)					
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	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 inform	ation				
SARA 311/312 Hazards : Sudden Release of Pressure Hazard Acute Health Hazard					
California Prop. 65	: WARNING! This product contains State of California to cause cancer Dichloromethane				
	: WARNING! This product contains State of California to cause birth de harm. Chloromethane				
Massachusetts RTK	: Dichloromethane	75-09-2			
New Jorgey DTV					
New Jersey RTK	: Difluoromethane	75-10-5			
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laterial Safety Data She	et	۰. ۱	engen <sup>28</sup> nationen in suger engelen von die geboren geboren in sterreichen die geboren.
enetron Performax L	T 13.3kg/25l	lb Cyl	, ·
ersion 1		ate 01/28/2010	Print Date 04/15/201
Pennsylvania RTK	: Difluorometha	ane	75-10-5
WHMIS Classification	: A This product I	nd the MSDS contains a	ording to the hazard criteria all of the information
ECTION 16. OTHER INFORMA	TION		
Health hazard Flammability Physical Hazard Instability	HMIS III 1 1 2 0 2	NFPA 2 1 0	