IMPIANTO PILOTA GEOTERMICO
“CASA DEL CORTO”

[ID: 3212 - 3214] Risposte alle Richieste di Integrazioni

Allegato 1: Caratteristiche del Fluido Organico

Preparato per:
Svolta Geotermica Srl

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STEAM

Genetron® 245fa

000000009878

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Genetron® 245fa
MSDS Number	:	000000009878
Product Use Description	:	Refrigerant, Heat transfer fluid
Manufacturer or supplier's details	:	Honeywell International Inc. 115 Tabor Road Morris Plains, NJ 07950-2546
For more information call	:	800-522-8001 +1-973-455-6300 (Monday-Friday, 9:00am-5:00pm)
In case of emergency call	:	**Medical: 1-800-498-5701 or +1-303-389-1414**
	:	**Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887**
	:	
	:	(24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form	:	Liquefied gas
Color	:	colourless
Odor	:	weak

Classification of the substance or mixture

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

GHS Label elements, including precautionary statements

Symbol(s) :

Signal word : Warning

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

Precautionary statements : **Prevention:**
Use personal protective equipment as required.

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

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

Carcinogenicity

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

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : CHF2CH2CF3

Chemical nature : Substance

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

SECTION 4. FIRST AID MEASURES

Inhalation : Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a

qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.

Skin contact : After contact with skin, wash immediately with plenty of water. If symptoms persist, call a physician. Take off all contaminated clothing immediately. Wash contaminated clothing before re-use.

Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.

Ingestion : Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician immediately.

Notes to physician

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

SECTION 5. FIREFIGHTING MEASURES

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

Specific hazards during firefighting : This product is not flammable at ambient temperatures and atmospheric pressure.
However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.
Cool closed containers exposed to fire with water spray.
Do not allow run-off from fire fighting to enter drains or water courses.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Exposure to decomposition products may be a hazard to

health.
In case of fire hazardous decomposition products may be produced such as:
Hydrogen fluoride
Carbon monoxide
Carbon dioxide (CO2)
Carbonyl halides

Special protective equipment for firefighters : In the event of fire and/or explosion do not breathe fumes.
Wear self-contained breathing apparatus and protective suit.
No unprotected exposed skin areas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

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

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

SECTION 7. HANDLING AND STORAGE

Handling

Handling : Handle with care.
Do not get in eyes, on skin, or on clothing.
Do not use in areas without adequate ventilation.

Perform filling operations only at stations with exhaust ventilation facilities.
Open drum carefully as content may be under pressure.
Do not breathe vapours or spray mist.

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

Storage

Requirements for storage areas and containers : Store away from incompatible substances.
Keep away from direct sunlight.
Keep containers tightly closed in a dry, cool and well-ventilated place.
Ensure adequate ventilation, especially in confined areas.
Keep in original packaging, tightly closed.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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

Engineering measures : Use with local exhaust ventilation.
Perform filling operations only at stations with exhaust ventilation facilities.

Eye protection : Do not wear contact lenses.
Wear as appropriate:
Safety glasses with side-shields
If splashes are likely to occur, wear:
Goggles or face shield, giving complete protection to eyes

Hand protection : Impervious butyl rubber gloves
Neoprene gloves
Gloves must be inspected prior to use.
Replace when worn.

Skin and body protection : Wear as appropriate:
Solvent-resistant gloves
Solvent-resistant apron and boots
If splashes are likely to occur, wear:
Protective suit

Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.
Wear a positive-pressure supplied-air respirator.
For rescue and maintenance work in storage tanks use self-contained breathing apparatus.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Avoid contact with skin, eyes and clothing.
Ensure adequate ventilation, especially in confined areas.
Remove and wash contaminated clothing before re-use.
Contaminated work clothing should not be allowed out of the workplace.
Keep working clothes separately.
Wash hands before breaks and immediately after handling the product.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
1,1,1,3,3-Pentafluoropropane	460-73-1	TWA : time weighted average	1,644 mg/m3 (300 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state : Liquefied gas

Color : colourless

Odor : weak

pH : Note: neutral

Melting point/freezing point	:	-103 °C
Boiling point/boiling range	:	15.3 °C
Flash point	:	Note: not applicable
Evaporation rate	:	< 1 Method: Compared to Ether (anhydrous).
	:	> 1 Method: Compared to CCl4.
lower flammability limit	:	Note: None
upper flammability limit	:	Note: None
Vapor pressure	:	1,227 hPa at 20 °C(68 °F) 3,882 hPa at 54.4 °C(129.9 °F)
Vapor density	:	4.6 Note: (Air = 1.0)
Density	:	1.32 g/cm3 at 20 °C
Water solubility	:	7.18 g/l
Solubility in other solvents	:	Medium: Methanol Note: partly soluble
		Medium: Diethylether Note: partly soluble
Partition coefficient:	:	log Pow: 1.35

n-octanol/water		Note: The product is more soluble in octanol.
Ignition temperature	:	412 °C
Decomposition temperature	:	> 250 °C
Molecular weight	:	134.03 g/mol
Global warming potential (GWP)	:	950
Ozone depletion potential (ODP)	:	0

SECTION 10. STABILITY AND REACTIVITY

Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Hazardous polymerisation does not occur.
Conditions to avoid	:	Protect from heat/overheating. Keep away from direct sunlight. Heat, flames and sparks.
Incompatible materials to avoid	:	Strong acids and strong bases Finely divided aluminium Sodium Potassium Calcium Magnesium Zinc Barium Lithium Strong oxidizing agents
Hazardous decomposition products	:	In case of fire hazardous decomposition products may be produced such as: Carbon monoxide Carbon dioxide (CO2) Carbonyl halides Hydrogen fluoride

SECTION 11. TOXICOLOGICAL INFORMATION

Acute inhalation toxicity	:	LC50: > 200000 ppm Exposure time: 4 h Species: rat Note: No deaths Evidence of transient anesthetic effect.
	:	LC50: > 100000 ppm Exposure time: 4 h Species: mouse Note: No deaths Evidence of transient underactivity during exposure.
Acute dermal toxicity	:	LD50: > 2,000 mg/kg Species: rabbit
Sensitisation	:	Cardiac sensitization Species: dogs Note: No effects noted at 35,000 ppm, the threshold for induction of cardiac arrhythmias in the presence of injected adrenalin was 44,000 ppm.
Repeated dose toxicity	:	Species: rat NOEL: 50000 ppm Note: Embryotoxicity Not a teratogen
	:	Species: rat (pups) NOEL: 50000 ppm
	:	Species: rat (dams) NOEL: 2000 ppm Note: due to decrease in body weight gains at 10,000 ppm and 50,000 ppm
	:	Species: rat Method: 2 Generation Inhalation Toxicity Note: Exposures 6hrs/day, 7 days/wk at 0(control), 2000, 10,000 and 50,000 ppm.

: Species: rat (dams)
Note: Toxicity seen in dams at 10,000 and 50,000 ppm and in pups at 50,000 ppm. Increased mortality late in the lactation phase of the study.

: Species: rat
Note: 28-day Inhalation Study NOAEL (No observed adverse effect level) - 50,000 ppm NOEL - 500 ppm Dose levels: 0,500, 2000, 10,000 and 50,000 ppm

: Species: rat
Note: 90-day Inhalation Study Dose levels: 0,500, 2000, 10,000 and 50,000 ppm NOAEL (No observed adverse effect level) - 2,000 ppm

: Note: Overall, subchronic studies showed dose-related increases in urinary fluoride levels, urine volumes and water consumption. Increases were noted in hematological parameters, BUN levels and serum liver enzyme activities (GOT, GPT). These increases did not follow a dose response; however, they indicate that HFC-245fa is metabolized in the liver. Significant recovery was noted in these parameters following a 2-week, non-exposure period which followed the 28-day exposure period. No histopathological effects were noted in the 28-day study. The 90-day study noted an increase in incidence and severity (trace to moderate) of mycarditis (inflammation of the heart muscle) at 10,000 and 50,000 ppm. This was not noted at the 500 or 2,000 ppm dose levels nor was it seen the 28-day study at 50,000 ppm.

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

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

Genotoxicity in vivo : Species: mouse
Cell type: Bone marrow
Application Route: Inhalation
Method: Mutagenicity (micronucleus test)
Result: negative

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity effects

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

Further information on ecology

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

SECTION 13. DISPOSAL CONSIDERATIONS

SECTION 14. TRANSPORT INFORMATION

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

SECTION 15. REGULATORY INFORMATION

Inventories

US. Toxic Substances Control Act	:	On TSCA Inventory
Australia. Industrial Chemical (Notification and	:	On the inventory, or in compliance with the inventory

Assessment) Act

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	:	All components of this product are on the Canadian DSL.
Japan. Kashin-Hou Law List	:	On the inventory, or in compliance with the inventory
Korea. Toxic Chemical Control Law (TCCL) List	:	On the inventory, or in compliance with the inventory
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	:	Not in compliance with the inventory
	:	1,1,1,3,3-Pentafluoropropane 460-73-1
China. Inventory of Existing Chemical Substances	:	On the inventory, or in compliance with the inventory
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	:	On the inventory, or in compliance with the inventory

National regulatory information

SARA 302 Components	:	SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components	:	SARA 313: 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

California Prop. 65	:	WARNING! This product contains a chemical known to the State of California to cause cancer. Dichloromethane 75-09-2
Massachusetts RTK	:	Dichloromethane 75-09-2
Pennsylvania RTK	:	Dichloromethane 75-09-2
WHMIS Classification	:	A: Compressed Gas This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.
Global warming potential	:	950
Ozone depletion potential (ODP)	:	0

SECTION 16. OTHER INFORMATION

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

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 warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

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