

**Genetron® 410A**

Version 2

Revision Date 10/04/2010

Print Date 04/13/2012

**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Genetron® AZ-20 (R-410A)  
MSDS Number : 00000009881  
Product Use Description : Refrigerant

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

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

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

**SECTION 2. HAZARDS IDENTIFICATION****Emergency Overview**

Form : Liquefied gas

Color : colourless

Odor : weak

Hazard Summary : Warning! Container under pressure. 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 : Avoid skin contact with leaking liquid (danger of frostbite).

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

**Carcinogenicity**

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

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical nature : Substance

Chemical Name	CAS-No.	Concentration
Pentafluoroethane	354-33-6	50.00%
Difluoromethane	75-10-5	50.00%

**SECTION 4. FIRST AID MEASURES**

- Inhalation : Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.
- Skin contact : After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a

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- physician.
- Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.
- Ingestion : Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Call a physician immediately.

**Notes to physician**

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

**SECTION 5. FIRE-FIGHTING MEASURES**

- Flash point : not applicable
- Ignition temperature : >750 °C (1,382 °F)
- Lower explosion limit : None
- Upper explosion limit : None
- Specific hazards during fire fighting : Contents under pressure.  
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.  
Container may rupture on heating.  
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.  
In case of fire hazardous decomposition products may be produced such as:  
Hydrogen halides  
Hydrogen fluoride  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)

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Carbonyl halides

Special protective equipment for fire-fighters : 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 : Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Remove all sources of ignition. Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid accumulation of vapours in low areas. Unprotected personnel should not return until air has been tested and determined safe. Ensure that the oxygen content is  $\geq 19.5\%$ .

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

Methods for cleaning up : Ventilate the area.

**SECTION 7. HANDLING AND STORAGE****Handling**

Handling : Handle with care. Avoid inhalation of vapour or mist. Do not get in eyes, on skin, or on clothing. Wear personal protective equipment. Use only in well-ventilated areas. Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Follow all standard safety precautions for handling and use of compressed gas cylinders. 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

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flame or any incandescent material.  
Do not remove screw cap until immediately ready for use.  
Always replace cap after use.

Advice on protection against fire and explosion : The product is not flammable.  
Can form a combustible mixture with air at pressures above atmospheric pressure.

### Storage

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

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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

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

Eye protection : Wear as appropriate:  
Safety glasses with side-shields  
If splashes are likely to occur, wear:  
Goggles or face shield, giving complete protection to eyes

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

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

Respiratory protection : In case of insufficient ventilation wear suitable respiratory

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equipment.

Wear a positive-pressure supplied-air respirator.

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

For rescue and maintenance work in storage tanks use self-contained breathing apparatus.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.  
 Ensure adequate ventilation, especially in confined areas.  
 Avoid contact with skin, eyes and clothing.  
 Remove and wash contaminated clothing before re-use.  
 Keep working clothes separately.

**Exposure Guidelines**

Difluoromethane	75-10-5	WEEL	TWA	1,000 ppm	2,200 mg/m <sup>3</sup>
		HONEYWELL	TWA	1,000 ppm	
Pentafluoroethane	354-33-6	WEEL	TWA	1,000 ppm	4,900 mg/m <sup>3</sup>
		HONEYWELL	TWA	1,000 ppm	

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

Form : Liquefied gas

Color : colourless

Odor : weak

pH : neutral

Freezing point : not determined

Boiling point/boiling range : -48.5 °C (-55.3 °F)

Vapor pressure : 14,844 hPa  
at 21.1 °C (70.0 °F)

Vapor pressure : 33,798 hPa  
at 54.4 °C (129.9 °F)

Relative vapour density : 3

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(Air = 1.0)

Density	:	1.08 g/cm <sup>3</sup> at 21.1 °C (70.0 °F)
Water solubility	:	no data available
Partition coefficient: n-octanol/water	:	log Pow: 1.48
Partition coefficient: n-octanol/water	:	log Pow: 0.21

**SECTION 10. STABILITY AND REACTIVITY**

Conditions to avoid	:	Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Materials to avoid	:	Finely divided aluminium Potassium Calcium Powdered metals Aluminium Magnesium Zinc
Hazardous decomposition products	:	In case of fire hazardous decomposition products may be produced such as: Hydrogen fluoride Carbonyl halides Carbon monoxide Carbon dioxide (CO <sub>2</sub> )
Thermal decomposition	:	>250 °C
Hazardous reactions	:	Hazardous polymerisation does not occur. Stable under normal conditions.

**SECTION 11. TOXICOLOGICAL INFORMATION**

Acute inhalation toxicity

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Pentafluoroethane	:	> 769000 ppm Exposure time: 4 h Species: rat
		> 769000 ppm Exposure time: 4 h Species: rat
Difluoromethane	:	LC50: > 520000 ppm Exposure time: 4 h Species: rat
Sensitisation Pentafluoroethane	:	Cardiac sensitization Species: dogs Note: No-observed-effect level 75,000 ppm Lowest observable effect level 100,000 ppm
Difluoromethane	:	Cardiac sensitization Species: dogs Note: No-observed-effect level >350,000 ppm
Repeated dose toxicity Pentafluoroethane	:	Species: rat Application Route: Inhalation Exposure time: (4 Weeks) NOEL: 50000 ppm Subchronic toxicity
Difluoromethane	:	Species: rat Application Route: Inhalation Exposure time: (90 d) NOEL: 50000 ppm Subchronic toxicity
Genotoxicity in vitro Pentafluoroethane	:	Test Method: Ames test Result: negative
Difluoromethane	:	Test Method: Ames test Result: negative
	:	Cell type: Human lymphocytes



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Result: negative

: Cell type: Chinese Hamster Ovary Cells  
Result: negative

: Cell type: Human lymphocytes  
Result: negative  
Method: Mutagenicity (in vitro mammalian cytogenetic test)

: Test Method: Chromosome aberration test in vitro  
Result: negative

### Genotoxicity in vivo Difluoromethane

: Species: mouse  
Cell type: Bone marrow  
Method: Mutagenicity (micronucleus test)  
Result: negative

### Teratogenicity Pentafluoroethane

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

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

### Difluoromethane

: Species: rat  
Dose: NOEL - 50,000 ppm  
Note: Did not show teratogenic effects in animal experiments.

Species: rabbit  
Dose: NOEL - 50,000 ppm  
Note: Did not show teratogenic effects in animal experiments.

### Further information

: Acute toxicity 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.

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**SECTION 12. ECOLOGICAL INFORMATION**

Biodegradability  
Pentafluoroethane : Result: Not readily biodegradable.  
Value: 5 %  
Method: OECD 301 D

Difluoromethane : Note: Minimal

**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.

**SECTION 13. DISPOSAL CONSIDERATIONS**

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

**SECTION 14. TRANSPORT INFORMATION**

**DOT** UN/ID No. : UN 3163  
Proper shipping name : LIQUEFIED GAS, N.O.S.  
(Pentafluoroethane, Difluoromethane)  
Class : 2.2  
Packing group :  
Hazard Labels : 2.2

**IATA** UN/ID No. : UN 3163  
Description of the goods : LIQUEFIED GAS, N.O.S.  
(Pentafluoroethane, Difluoromethane)  
Class : 2.2  
Hazard Labels : 2.2  
Packing instruction (cargo) : 200

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	aircraft)		
	Packing instruction	:	200
	(passenger aircraft)		
<b>IMDG</b>	UN/ID No.	:	UN 3163
	Description of the goods	:	LIQUEFIED GAS, N.O.S. (PENTAFLUOROETHANE, DIFLUOROMETHANE)
	Class	:	2.2
	Hazard Labels	:	2.2
	EmS Number	:	F-C
	Marine pollutant	:	no

**SECTION 15. REGULATORY INFORMATION****Inventories**

1907/2006 (EU)	:	This mixture contains only ingredients which have been subject to a pre-registration according to Regulation (EC) No. 1907/2006 (REACH).
US. Toxic Substances Control Act	:	On TSCA Inventory
Australia. Industrial Chemical (Notification and Assessment) Act	:	On the inventory, or in compliance with the inventory
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133)	:	All components of this product are on the Canadian DSL list.
Japan. Kashin-Hou Law List	:	On the inventory, or in compliance with the inventory
Korea. Toxic Chemical Control Law (TCCL) List	:	On the inventory, or in compliance with the inventory
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	:	On the inventory, or in compliance with the inventory
China. Inventory of Existing Chemical Substances	:	On the inventory, or in compliance with the inventory
NZIOC - New Zealand	:	On the inventory, or in compliance with the inventory

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**National regulatory information**

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

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

: WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.  
Chloromethane 74-87-3

**Massachusetts RTK** : Dichloromethane 75-09-2

**New Jersey RTK** : Difluoromethane 75-10-5

**Pennsylvania RTK** : Difluoromethane 75-10-5

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

**Global warming potential** : 1,975

**Ozone depletion potential (ODP)** : 0

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**SECTION 16. OTHER INFORMATION**

	<b>HMIS III</b>	<b>NFPA</b>
Health hazard	: 1	2
Flammability	: 1	1
Physical Hazard	: 0	
Instability	:	0