

**Genetron® HP80 (R-402A)**

Version 2

Revision Date 04/06/2011

Print Date 04/06/2011

**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Genetron® HP80 (R-402A)  
MSDS Number : 00000009892  
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 hydrochloric acid (HCl), 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.  
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 Name         | CAS-No.  | Concentration   |
|-----------------------|----------|-----------------|
| Pentafluoroethane     | 354-33-6 | 58.00 - 62.00 % |
| Chlorodifluoromethane | 75-45-6  | 36.00 - 40.00 % |
| Propane               | 74-98-6  | 1.00 - 2.00 %   |

**SECTION 4. FIRST AID MEASURES**

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

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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

Lower explosion limit : None

Upper explosion limit : None

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

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:

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Gaseous hydrogen chloride (HCl).  
Hydrogen fluoride  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)  
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. 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.

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Do not puncture or drop cylinders, expose them to open flame or excessive heat.  
 Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.  
 Do not remove screw cap until immediately ready for use. Always replace cap after use.

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

**Storage**

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

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

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

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

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

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

Skin and body protection : Protective suit  
 Avoid skin contact with leaking liquid (danger of frostbite).

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Wear cold insulating gloves/ face shield/ eye protection.

Respiratory protection : In case of insufficient ventilation wear suitable respiratory equipment.  
 Wear a positive-pressure supplied-air respirator.  
 Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.  
 For rescue and maintenance work in storage tanks use self-contained breathing apparatus.

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

**Exposure Guidelines**

|                       |          |           |      |           |             |
|-----------------------|----------|-----------|------|-----------|-------------|
| Pentafluoroethane     | 354-33-6 | WEEL      | TWA  | 1,000 ppm | 4,900 mg/m3 |
|                       |          | HONEYWELL | TWA  |           | 1,000 ppm   |
| Chlorodifluoromethane | 75-45-6  | ACGIH     | TWA  |           | 1,000 ppm   |
|                       |          | NIOSH     | STEL | 1,250 ppm | 4,375 mg/m3 |
|                       |          | NIOSH     | REL  | 1,000 ppm | 3,500 mg/m3 |
|                       |          | OSHA Z1A  | TWA  | 1,000 ppm | 3,500 mg/m3 |
| Propane               | 74-98-6  | ACGIH     | TWA  |           | 1,000 ppm   |
|                       |          | NIOSH     | REL  | 1,000 ppm | 1,800 mg/m3 |
|                       |          | OSHA Z1   | PEL  | 1,000 ppm | 1,800 mg/m3 |
|                       |          | OSHA Z1A  | TWA  | 1,000 ppm | 1,800 mg/m3 |

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**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

|  |  |
|--|--|
| Form                                   | : Liquefied gas                                  |
| Color                                  | : colourless                                     |
| Odor                                   | : weak   |
| pH                                     | : neutral  |
| Freezing point                         | : no data available                              |
| Boiling point/boiling range            | : -49.2 °C (-56.6 °F)                            |
| Vapor pressure                         | : 11,928 hPa<br>at 21.1 °C (70.0 °F)             |
| Vapor pressure                         | : 26,883 hPa<br>at 54.4 °C (129.9 °F)            |
| Relative vapour density                | : 3.5<br>(Air = 1.0)                             |
| Density                                | : 1.14 g/cm <sup>3</sup><br>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: 1.08 - 1.13                           |
| Solubility in other solvents           | : no data available                              |

**SECTION 10. STABILITY AND REACTIVITY**

|                     |  |
|---------------------|--|
| Conditions to avoid | : Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.<br>Decomposes under high temperature.<br>Some risk may be expected of corrosive and toxic decomposition products.<br>Can form a combustible mixture with air at pressures above atmospheric pressure.<br>Do not mix with oxygen or air above atmospheric pressure. |
| Materials to avoid  | : Finely divided aluminium   |

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Potassium  
Calcium  
Powdered metals  
Aluminium  
Magnesium  
Zinc

Hazardous decomposition products : In case of fire hazardous decomposition products may be produced such as:  
Gaseous hydrogen chloride (HCl).  
Hydrogen fluoride  
Carbonyl halides  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)

Thermal decomposition : >250 °C

**SECTION 11. TOXICOLOGICAL INFORMATION**

Acute inhalation toxicity  
Pentafluoroethane : > 769000 ppm  
Exposure time: 4 h  
Species: rat

Chlorodifluoromethane : LC50: > 300000 ppm  
Exposure time: 4 h  
Species: rat

Propane : LC50: > 800000 ppm  
Exposure time: 15 min  
Species: rat

Sensitisation  
Pentafluoroethane : Cardiac sensitization  
Species: dogs  
Note: No-observed-effect level  
75 000 ppm  
Lowest observable effect level  
100 000 ppm

Chlorodifluoromethane : Cardiac sensitization  
Species: dogs  
Note: Chlorodifluoromethane (HCFC-22): Cardiac sensitisation threshold (dog): 50000 ppm.

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## Repeated dose toxicity

## Pentafluoroethane

: Species: rat  
 Application Route: Inhalation  
 Exposure time: (4 Weeks)  
 NOEL: 50000 ppm  
 Subchronic toxicity

## Chlorodifluoromethane

: Species: rat  
 Application Route: Inhalation  
 Exposure time: Lifetime Exposure ()  
 NOEL: 10000 ppm  
 Lifetime exposure of male rats was associated with a small increase in salivary gland fibrosarcomas.

## Pentafluoroethane

: Test Method: Ames test  
 Result: negative

: Cell type: Human lymphocytes  
 Result: negative

: Cell type: Chinese Hamster Ovary Cells  
 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.

## Further information

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

**SECTION 12. ECOLOGICAL INFORMATION**

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## Toxicity to fish

Chlorodifluoromethane : static test  
LC50: 777 mg/l  
Exposure time: 96 h  
Species: Danio rerio (zebra fish)

## Toxicity to daphnia and other aquatic invertebrates.

Chlorodifluoromethane : static test  
EC50: 433 mg/l  
Exposure time: 48 h  
Species: Daphnia magna (Water flea)

## Biodegradability

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

**Further information on ecology**

Additional ecological information : 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.  
This product is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82. Section 611 requires the following label text on all shipments of this product:  
Warning: Contains Chlorodifluoromethane (HCFC-22), a substance which harms public health and environment by destroying ozone in the upper atmosphere.  
Refer to sections 610 and 612 for list of acceptable and unacceptable uses for this product.

**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**

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|             |  |   |
|-------------|--|---|
| <b>DOT</b>  | UN/ID No.                                | : UN 3163   |
|             | Proper shipping name                     | : LIQUEFIED GAS, N.O.S.<br>(Pentafluoroethane, Chlorodifluoromethane,<br>Propane) |
|             | Class                                    | : 2.2   |
|             | Packing group                            |   |
|             | Hazard Labels                            | : 2.2   |
| <b>IATA</b> | UN/ID No.                                | : UN 3163   |
|             | Description of the goods                 | : LIQUEFIED GAS, N.O.S.<br>(Pentafluoroethane, Chlorodifluoromethane,<br>Propane) |
|             | Class                                    | : 2.2   |
|             | Hazard Labels                            | : 2.2   |
|             | Packing instruction (cargo aircraft)     | : 200   |
|             | Packing instruction (passenger aircraft) | : 200   |
|             |  |   |
| <b>IMDG</b> | UN/ID No.                                | : UN 3163   |
|             | Description of the goods                 | : LIQUEFIED GAS, N.O.S.<br>(PENTAFLUOROETHANE,<br>CHLORODIFLUOROMETHANE, PROPANE) |
|             | 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). | : All components of this product are on the Canadian DSL list.   |

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Japan. Kashin-Hou Law : On the inventory, or in compliance with the inventory  
List

Japan. Industrial Safety & : On the inventory, or in compliance with the inventory  
Health Law (ISHL) List

Korea. Existing Chemicals : On the inventory, or in compliance with the inventory  
Inventory (KECI)

Philippines. The Toxic : On the inventory, or in compliance with the inventory  
Substances and Hazardous  
and Nuclear Waste Control  
Act

China. Inventory of Existing : On the inventory, or in compliance with the inventory  
Chemical Substances

NZIOC - New Zealand : On the inventory, or in compliance with the inventory

**National regulatory information**

**SARA 313 Components** : Chlorodifluoromethane 75-45-6

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

**California Prop. 65** : This product does not contain any chemicals known to State of  
California to cause cancer, birth defects, or any other  
reproductive harm.

**Massachusetts RTK** : Chlorodifluoromethane 75-45-6  
: Propane 74-98-6

**New Jersey RTK** : Chlorodifluoromethane 75-45-6  
: Pentafluoroethane 354-33-6  
: Propane 74-98-6

**Pennsylvania RTK** : Chlorodifluoromethane 75-45-6  
: Pentafluoroethane 354-33-6

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: Propane 74-98-6

**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** : 2,040**Ozone depletion potential (ODP)** : 0.02**SECTION 16. OTHER INFORMATION**

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