Genetron® MP39 (R-401A)

000000011265

Version 1.3 | Revision Date 09/13/2012 | Print Date 03/17/2015

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Genetron® MP39 (R-401A)
MSDS Number	:	000000011265
Product Use Description	:	Refrigerant
Company	:	Honeywell International Inc. 101 Columbia Road Morristown, NJ 07962-1057
For more information call	:	800-522-8001 +1-973-455-6300 (Monday-Friday, 9:00am-5:00pm)
In case of emergency call	:	**Medical (PROSAR): 1-800-498-5701 or +1-651-523-0309**
	:	**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	:	slight sweet ether-like
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). 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 Name	CAS-No.	Concentration
Chlorodifluoromethane	75-45-6	52.50 - 54.50 %
1-Chloro-1,2,2,2-tetrafluoroethane	2837-89-0	33.00 - 34.00 %

1,1-Difluoroethane	75-37-6	11.50 - 13.50 %

SECTION 4. FIRST AID MEASURES

Inhalation	:	Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.
Skin contact	:	After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a physician.
Eye contact	:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be 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.

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	:	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:
Gaseous hydrogen chloride (HCl).
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 full protective clothing and self-contained breathing apparatus.
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 >= 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. 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. 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 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

Components	CAS-No.	Value	Control parameters	Update	Basis

Chlorodifluoromethane	75-45-6	TWA : time weighted average	3,500 mg/m3 (1,000 ppm)	07 2009	CAD AB OEL:Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)
Chlorodifluoromethane	75-45-6	STEL : Short term exposure limit	(1,250 ppm)	07 2007	CAD BC OEL:Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)
Chlorodifluoromethane	75-45-6	TWA : time weighted average	(500 ppm)	07 2007	CAD BC OEL:Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)
Chlorodifluoromethane	75-45-6	TWA : time weighted average	(1,000 ppm)	03 2011	CAD MB OEL:Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Chlorodifluoromethane	75-45-6	STEV : Short Term Exposure Limit (STEV):	(1,250 ppm)	07 2010	CAD ON OEL:Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)
Chlorodifluoromethane	75-45-6	TWA : time weighted average	(1,000 ppm)	07 2010	CAD ON OEL:Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)
Chlorodifluoromethane	75-45-6	15 MIN ACL : 15 minute average contamination limit:	(1,250 ppm)	05 2009	CAD SK OEL:Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21)
Chlorodifluoromethane	75-45-6	8 HR ACL : 8 hour average contamination limit:	(1,000 ppm)	05 2009	CAD SK OEL:Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21)

Chlorodifluoromethane	75-45-6	TWA : time weighted average	3,540 mg/m3 (1,000 ppm)	12 2008	OEL (QUE):Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)
1-Chloro-1,2,2,2-tetrafluoroethane	2837-89-0	TWA : time weighted average	(1,000 ppm)	1994	Honeywell:Limit established by Honeywell International Inc.
1-Chloro-1,2,2,2-tetrafluoroethane	2837-89-0	TWA : time weighted average	(1,000 ppm)	2007	WEEL:US. Workplace Environmental Exposure Level (WEEL) Guides
1,1-Difluoroethane	75-37-6	TWA : time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	:	Liquefied gas
Color	:	colourless
Odor	:	slight sweet ether-like
pH	:	Note: neutral
Melting point/freezing point	:	Note: not determined
Boiling point/boiling range	:	-33 °C

Flash point	:	Note: not applicable
Evaporation rate	:	> 1 Method: Compared to CCl4.
Lower explosion limit	:	Note: None
Upper explosion limit	:	Note: None
Vapor pressure	:	7,018 hPa at 21.1 °C(70.0 °F) 16,430 hPa at 54.4 °C(129.9 °F)
Vapor density	:	3.5 Note: (Air = 1.0)
Density	:	1.188 g/cm3 at 25 °C
Water solubility	:	2.4 g/l at 25 °C at 1,013 hPa
Ignition temperature	:	Note: not determined
Decomposition temperature	:	> 250 °C
Global warming potential (GWP)	:	1,182
Ozone depletion potential (ODP)	:	0.04

SECTION 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 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.
Incompatible materials to avoid	:	Finely divided aluminium Potassium Calcium Powdered metals Aluminium Magnesium Zinc
Hazardous decomposition products	:	In case of fire hazardous decomposition products may be produced such as: Gaseous hydrogen chloride (HCl). Gaseous hydrogen fluoride (HF). Carbonyl halides Carbon monoxide Carbon dioxide (CO2)

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity 1,1-Difluoroethane	:	LDLo: > 1,500 mg/kg Species: rat Note: No deaths
Acute inhalation toxicity	:	LC50: > 300000 ppm

		Exposure time: 4 h Species: rat Test substance: Chlorodifluoromethane (HCFC-22)
	:	LC50: 360000 ppm Exposure time: 4 h Species: rat Test substance: 2-chloro-1,1,1,2- tetrafluoroethane. (HCFC-124)

Sensitisation

Chlorodifluoromethane	:	Cardiac sensitization Species: dogs Note: Chlorodifluoromethane (HCFC-22): Cardiac sensitisation threshold (dog): 50000 ppm.
1,1-Difluoroethane	:	Cardiac sensitization Note: No-observed-effect level >150,000 ppm

Repeated dose 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.
1-Chloro-1,2,2,2-tetrafluoroethane	:	Species: rat (pups) NOEL: 50000 ppm Teratogenicity Species: rat (dams) NOEL: 15000 ppm Teratogenicity
1-Chloro-1,2,2,2-tetrafluoroethane	:	Note: In vitro tests did not show mutagenic effects
1,1-Difluoroethane	:	Test Method: Ames test Result: negative

Carcinogenicity

1,1-Difluoroethane	:	Species: rat Application Route: Inhalation Exposure time: two-year Note: Did not show carcinogenic effects in animal experiments.
Teratogenicity		
1-Chloro-1,2,2,2-tetrafluoroethane	:	Species: rat Application Route: Inhalation exposure Note: Did not show teratogenic effects in animal experiments. Species: rabbit Application Route: Inhalation exposure Note: Did not show teratogenic effects in animal experiments.
Further information	:	Note: Acute Health Hazard Chlorodifluoromethane (HCFC-22): Cardiac sensitisation threshold (dog): 50000 ppm. 2-chloro-1,1,1,2- tetrafluoroethane. (HCFC-124): Cardiac sensitisation threshold (dog): 25000 ppm. 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. Avoid skin contact with leaking liquid (danger of frostbite). May cause cardiac arrhythmia. Chronic Health Hazard In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects

SECTION 12. ECOLOGICAL INFORMATION

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)

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 Chlorotetrafluoroethane (HCFC-124),
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

Note : 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

TDG	UN/ID No.	:	UN 3163
	Proper shipping name	:	LIQUEFIED GAS, N.O.S. (CHLORODIFLUOROMETHANE, 1,1-DIFLUOROETHANE, 1-CHLORO-1,2,2,2-TETRAFLUOROETHANE)
	Class		2.2
	Packing group		
	Hazard Labels		2.2
IATA	UN/ID No.	:	UN 3163
	Description of the goods	:	LIQUEFIED GAS, N.O.S.

			(Chlorodifluoromethane, 1,1-Difluoroethane, 1-Chloro-1,2,2,2-tetrafluoroethane)
	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. (CHLORODIFLUOROMETHANE, 1,1-DIFLUOROETHANE, 1-CHLORO-1,2,2,2-TETRAFLUOROETHANE)
	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 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.
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	:	On the inventory, or in compliance with the inventory

Chemical Substances

NZIOC - New Zealand	:	On the inventory, or in compliance with the inventory
TSCA 12B	:	US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D) 1-Chloro-1,1,2,2-tetrafluoroethane 354-25-6

National regulatory information

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.
WHMIS Components	:	Chlorodifluoromethane 75-45-6
NPRI Components	:	Chlorodifluoromethane 75-45-6
	:	1-Chloro-1,2,2,2-tetrafluoroethane 2837-89-0
Global warming potential	:	1,182
Ozone depletion potential (ODP)	:	0.04

SECTION 16. OTHER INFORMATION

		HMIS III	NFPA
Health hazard	:	1	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.
Previous Issue Date: 08/25/2009
Prepared by: Honeywell Performance Materials and Technologies Product Stewardship Group