

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006, as amended

Honeywell

Genetron® 407C

000000009894

Version 4.2

Revision Date 20.12.2024

Supersedes 3

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

1.1. Product identifier

Product name : Genetron® 407C

SDS-number : 000000009894

Type of product : Mixture

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture : Refrigerant

Uses advised against : none

1.3. Details of the supplier of the safety data sheet

Company	: Honeywell Advanced Limited	Honeywell International, Inc.
	One Spencer Dock, North Wall	115 Tabor Road
	Quay	Morris Plains, NJ 07950-2546
	Dublin 1	USA
	Ireland	

Telephone : +353 1 447 9350

For further information, please contact: : SafetyDataSheet@Honeywell.com

1.4. Emergency telephone number

Emergency telephone number : +1-703-527-3887 (ChemTrec-Transport)
+1-303-389-1414 (Medical)
: Poison Control Center:
United Kingdom: (+44) 844 892 0111

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Gases under pressure Liquefied gas

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H280 Contains gas under pressure; may explode if heated.

2.2. Label elements

REGULATION (EC) No 1272/2008

Hazard pictograms	:		
Signal word	:	Warning	
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.
Special labelling of certain products:	:	Contains fluorinated greenhouse gases.	

2.3. Other hazards

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite. This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher. The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

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3.1. Substances

Not applicable

3.2. Mixtures

Chemical name	CAS-No. Index-No. REACH Registration Number EC-No.	Classification 1272/2008	Concentration	Remarks
Norflurane	811-97-2 212-377-0	Press. Gas ; H280	52 %	
Pentafluoroethane	354-33-6 206-557-8	Press. Gas ; H280	25 %	
Difluoromethane	75-10-5 200-839-4	Flam. Gas 1B; H221 Press. Gas ; H280	23 %	

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.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice:

First aider needs to protect himself. Move out of dangerous area. Take off all contaminated clothing immediately.

Inhalation:

Remove to fresh air. Artificial respiration and/or oxygen may be necessary. Call a physician immediately.

Skin contact:

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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:

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. As this product is a gas, refer to the inhalation section.

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.

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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

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.

Fire may cause evolution of:

Hydrogen fluoride

Carbon oxides

Halogenated compounds

Carbonyl halides

Gaseous hydrogen chloride (HCl).

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 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. Ensure that the oxygen content is $\geq 19.5\%$.

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6.2. Environmental precautions

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

Handle with care. Avoid inhalation of vapour or mist. Do not get on skin or clothing. Wear personal protective equipment. Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Use authorized cylinders only. Protect cylinders from physical damage. 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.

Hygiene measures:

Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. Do not get in eyes, on skin, or on clothing. Remove and wash contaminated clothing before re-use. Keep working clothes separately.

7.2. Conditions for safe storage, including any incompatibilities

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.

7.3. Specific end use(s)

Specific use information:

Restricted to professional users.
For industrial use only.

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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	HONEYWELL TWA	1.000 ppm		
Norflurane	EH40 WEL TWA	4.240 mg/m ³ 1.000 ppm		
Pentafluoroethane	HONEYWELL TWA	1.000 ppm		We are not aware of any national exposure limit.
Difluoromethane	HONEYWELL TWA	2.200 mg/m ³ 1.000 ppm		We are not aware of any national exposure limit.

HONEYWELL - Limit established by Honeywell International Inc.
TWA - Time weighted average

DNEL/ PNEC-Values

Component	End-use/impact	Exposure duration	Value	Exposure routes	Remarks
Norflurane	Workers / Long-term systemic effects		13936 mg/m ³	Inhalation	
Norflurane	Consumers / Long-term systemic effects		2476 mg/m ³	Inhalation	
Pentafluoroethane	Workers / Long-term systemic effects		16444 mg/m ³	Inhalation	
Pentafluoroethane	Consumers / Long-term systemic		1753 mg/m ³	Inhalation	

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	effects				
Difluoromethane	Workers / Long-term systemic effects		7035 mg/m ³	Inhalation	
Difluoromethane	Consumers / Long-term systemic effects		750 mg/m ³	Inhalation	

Component	Environmental compartment / Value	Remarks
Norflurane	Fresh water: 0,1 mg/l	Assessment factor: 1000
Norflurane	Marine water: 0,01 mg/l	Assessment factor: 10000
Norflurane	Fresh water sediment: 0,75 mg/kg	Assessment factor: 100
Norflurane	Sewage treatment plant: 73 mg/l	Assessment factor: 10
Pentafluoroethane	Fresh water: 0,1 mg/l	Assessment factor: 1000
Pentafluoroethane	Fresh water sediment: 0,6 mg/kg dw	
Difluoromethane	Fresh water: 0,142 mg/l	Assessment factor: 1000
Difluoromethane	Fresh water sediment: 0,534 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, 511; safety shoes EN-ISO 20345.

Personal protective equipment

Respiratory protection:

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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

- | | | |
|-------------------------------------|---|-------------------------------|
| (a) Physical state | : | gaseous |
| (b) Colour | : | colourless |
| (c) Odour | : | slight |
| (d) Melting point/freezing point | : | No data available |
| (e) Boiling point/boiling range | : | -43,9 °C |
| (g) Lower and upper explosion limit | : | Lower explosion limit
None |
| | : | Upper explosion limit
None |
| (h) Flash point | : | Not applicable |
| (i) Auto-ignition | : | No data available |

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temperature

(j) Decomposition temperature : 250 °C

(k) pH : neutral

(l) Viscosity, kinematic : No data available

(m) Solubility(ies) : Water solubility:
1,5 g/l

(n) Partition coefficient: n-octanol/water : log Pow 1,06
Medium: 1,1,1,2-tetrafluoroethane (HFC-134a)

(n) Partition coefficient: n-octanol/water : log Pow 1,48
Medium: Ethane, pentafluoro- (HFC-125)

(o) Vapour pressure : 10.769 hPa
at 21,1 °C

24.593 hPa
at 54,4 °C

(p) Density and / or relative density : 1,16 g/cm³
at 21,1 °C

(q) Relative vapour density : 3
(Air = 1.0)

(r) Particle characteristics : No data available

9.2 Other Information

Evaporation rate : > 1
Method: Compared to CCl₄.

Viscosity, dynamic : No data available

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SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions.

10.2. Chemical stability

No data available

10.3. Possibility of hazardous reactions

Hazardous polymerisation does not occur.

10.4. Conditions to avoid

Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.

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.

10.5. Incompatible materials

Oxidizing agents

Finely divided metal powders such as aluminum, magnesium, or zinc.

10.6. Hazardous decomposition products

Halogenated compounds

Hydrogen fluoride

Carbonyl halides

Carbon oxides

Gaseous hydrogen chloride (HCl).

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

(a) Acute toxicity

Acute oral toxicity:

Not applicable

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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: > 800000 ppm

Exposure time: 4 h

Test substance: Ethane, pentafluoro- (HFC-125)

Acute toxicity (other routes of administration):

No data available

(b) Skin corrosion/irritation:

No data available

(c) Serious eye damage/eye irritation:

No data available

(d) Respiratory or skin sensitisation:

No data available

(h) STOT-single exposure:

No data available

(i) STOT - repeated exposure:

Species: Rat

Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)

Note: NOEL – 40,000 ppm

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(j) Aspiration hazard:

No data available

11.2. Information on other hazards

Endocrine disrupting properties

No data available

Other information:

1,1,1,2-tetrafluoroethane (HFC-134a): Cardiac sensitisation threshold (dog): 80000 ppm.

Difluoromethane. (HFC-32): Cardiac sensitisation threshold (dog): 350000 ppm.

Ethane, pentafluoro- (HFC-125): Cardiac sensitisation threshold (dog): 75000 ppm.

Inhalation: May cause cardiac arrhythmia.

Rapid evaporation of the liquid may cause frostbite.

Avoid skin contact with leaking liquid (danger of frostbite).

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

SECTION 12: Ecological information

12.1. Toxicity

Toxicity to fish:

No data available

Toxicity to aquatic plants:

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

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No data available

12.6. Endocrine disrupting properties

No data available

12.7. Other adverse effects

Accumulation in aquatic organisms is unlikely.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product:

Dispose according to legal requirements. Refer to manufacturer/supplier for information on recovery/recycling.

Packaging:

Legal requirements are to be considered in regard of reuse or disposal of used packaging materials

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

14.1 UN number or ID number

ADR/RID:3340

IMDG:3340

IATA:3340

14.2 UN proper shipping name

ADR/RID:REFRIGERANT GAS R 407C

IMDG:REFRIGERANT GAS R 407C

IATA:Refrigerant gas R 407C

14.3 Transport hazard class(es)

ADR/RID:2.2

IMDG: 2.2

IATA: 2.2

14.4 Packaging group

No data available

14.5 Environmental hazards

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ADR/RID: no

Marine pollutant: no

14.6 Special precautions for user

IMDG Code segregation group according chapter 3.1.4.4 : NONE,

14.7 Maritime transport in bulk according to IMO instruments

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Basis	Value	Remarks
Substances of very high concern (SVHC)		This product does not contain substances of very high concern according to Regulation (EC) No Article 57 above the respective regulatory 1907/2006 (REACH), concentration limit of $\geq 0.1\%$ (w/w).

Global warming potential :
1.774

Other inventory information

USA. List of Active Substances on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory, as amended
On TSCA Inventory

Australia. Inventory of Industrial Chemicals (AIC), as amended
On the inventory, or in compliance with the inventory

Canada. Domestic Substances List (DSL), as amended
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

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Philippines. Inventory of Chemicals and Chemical Substances (PICCS)
On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances (IECSC)
On the inventory, or in compliance with the inventory

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

Taiwan Chemical Substance Inventory (TCSI)
Not in compliance with the inventory

15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

Text of H-statements referred 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	:	H221	Flammable gas.
		H280	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.

Abbreviations:

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

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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.