1. Identification

Product name R407C

Synonyms -

CAS # See section 3

Product code -

Product use Used as refrigerants.

Manufacturer/Supplier

Supplier(Manufacturer): iGas USA, Inc.

Address: 8105 Anderson Road, Tampa, FL 33634

Contact person(E-mail): projects@igasusa.com

Telephone: (813) 443-0757

Fax: (813) 886-7900

Emergency telephone Number:

2. Hazard(s) identification

GHS classification

Physical hazards Health Gases under pressure Liquefied gas

hazards Environmental Not classified

hazards Not classified

GHS label elements

Hazard Pictograms

Signal word Warning

Hazard statement Contains gas under pressure; may explode if heated.

Precautionary statement

Prevention Not applicable.

Response Not applicable.

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

Disposal Not applicable.

3. Composition / information on ingredients

Components	CAS#	Percent
Norflurane	811-97-2	52±2%
Pentafluoroethane	354-33-6	25±2%
Difluoromethane	75-10-5	23±2%

4. First-aid Measures

First aid procedures

Eye contact

Immediately irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 10 minutes. Obtain immediate medical attention.

Skin contact

Thaw affected area with water. Remove contaminated clothing. Caution: clothing may adhere to the skin in the case of freeze burns. After contact with skin, wash immediately with plenty of warm water. If irritation or blistering occur obtain medical attention.

Inhalation

Remove patient from exposure, keep warm and at rest. Administer oxygen if necessary. Apply artificial respiration if breathing has ceased or shows signs of failing. In the event of cardiac arrest apply external cardiac massage. Obtain immediate medical attention.

Ingestion

Ingestion is not considered a potential route of exposure. Do not induce vomiting. Provided the patient is conscious, wash out mouth with water and give 200-300 ml (half a pint) of water to drink. Obtain immediate medical attention.

Notes to physician

Treat symptoms.

5. Fire-fighting measures

Flammable properties

Non flammable.

Extinguishing media

Suitable extinguishing media

Use appropriate extinguishing media.

Unsuitable extinguishing media

Not available.

Firefighting equipment/instructions

Shut off gas supply if this can be done safely. If possible, take container out of dangerous zone. Cool cylinders with water spray. Self-contained breathing apparatus (SCBA) may be required if cylinders rupture or release under fire conditions.

Hazardous combustion products

Hydrogen fluoride by thermal decomposition and hydrolysis.

6. Accidental release measures

Personal precautions

Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions

Prevent liquid from entering drains, sewers, basements and work pits since the vapor may create a suffocating atmosphere.

Methods for cleaning up

Provided it is safe to do so, isolate the source of the leak. Allow small spillages to evaporate provided there is adequate ventilation. Large spillages: Ventilate area. Contain spillages with sand, earth or any suitable adsorbent material.

7. Handling and storage

Handling

Avoid inhalation of high concentrations of vapors. Atmospheric levels should be controlled in compliance with the occupational exposure limit. Atmospheric concentrations well below the occupational exposure limit can be achieved by good occupational hygiene practice. The vapor is heavier than air, high concentrations may be produced at low levels where general ventilation is poor, in such cases provide adequate ventilation or wear suitable respiratory protective equipment with positive air supply. Avoid contact with naked flames and hot surfaces as corrosive and very toxic

decomposition products can be formed. Avoid contact between the liquid and skin and eyes. For correct refrigerant composition, systems should be charged using the liquid phase and not the vapor phase.

Storage Keep in a well ventilated place. Keep in a cool place away from fire risk, direct sunlight and all sources of heat such as electric and steam radiators. Avoid storing near to the intake of air conditioning units, boiler units and open drains. Cylinders and Drums: Keep container dry. Storage temperature: < 45°C

8. Exposure controls / personal protection

Control parameters:

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA:

Not Available

EMERGENCY LIMITS:

Ingredient	TEEL-1	TEEL-2	TEEL-3
Difluoromethane	1,300 ppm	1300 ppm	39000 ppm

Ingredient	Original IDLH	Revised IDLH
Norflurane	Not Available	Not Available
Pentafluoroethane	Not Available	Not Available
Difluoromethane	Not Available	Not Available

Exposure controls:

Appropriate engineering controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Individual protection measures, such as personal protective equipment:

Eye / face protection Sufficient eye protection should be worn. When handling compressed gas, at least glasses with side protection should be worn. When handling liquid gas, chemical safety goggles must be used as well as a protective shield.

Skin protection Body protection: Use protective boots while handling gas cylinders.

Hand protection: Wear leather gloves to prevent frostbite injuries from rapidly expanding gas when handling pressurised gas bottles.

Respiratory protection In an emergency (e.g.: unintentional release of the substance, exceeding the occupational exposure limit value) respiratory protection must be worn. Consider the maximum period for wear. Wear self-contained breathing apparatus. Do not use filter respirator.

General hygiene considerations Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Keep away from foodstuffs, beverages and feed. Immediately remove all soiled and contaminated clothing.

9. Physical and chemical properties

Appearance

Physical state	Gas
Form	Compressed liquefied gas
Color	Clear, colorless

Odor	Slight ethereal
Odor threshold	Not available
pH	Not available
Vapor pressure	7810 mm Hg at 20°C
Melting point/Freezing point	Not available
initial boiling point and boiling range	-44.3°C to -37.1°C
Flash point	Not available
Evaporation rate	Not available
Flammability (solid, gas)	Non flammable
Explosion limits	Not available
Vapor density	3.0 at bubble point temperature. (Air = 1)
Relative density	Not available
Solubility (water)	Insoluble in water
Partition coefficient	Log pow = 0.21 (25 °C) (CAS# 75-10-5)
	Log pow =1.48(25 °C) (CAS# 354-33-6)
	Log pow =1.06 (25 °C) (CAS#811-97-2)
Auto-ignition temperature	Not available
Decomposition temperature	Not available
Specific gravity	Not available
Density	1.16 g/cm3 at 20°C
Flammability limits in air, upper, %by volume	Not available
Flammability limits in air, lower, % by volume	Not available
VOC	Not available
Percent volatile	Not available
Other data	
Viscosity	Not available

10. Stability and reactivity

Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Incompatible materials. Avoid open flames and high temperatures.
Incompatible materials	Finely divided metals, magnesium and alloys containing more than 2% magnesium.
Hazardous decomposition products	Hydrogen fluoride by thermal decomposition and hydrolysis.
Possibility of hazardous reactions	Can react violently if in contact with alkali metals and alkaline earth metals - sodium, potassium, barium.

11. Toxicological information

Toxicokinetics, metabolism and distribution:

Non-human toxicological data: Not available

Information on toxicological effects:

Acute toxicity:

Norflurane (CAS#811-97-2)

LD50(Oral, Rat):	Not available
LD50(Dermal, Rabbit):	Not available
LC50(Inhalation, Rat):	1500 mg/m3/4h

Pentafluoroethane(CAS#354-33-6)

LD50(Oral, Rat): Not available

LD50(Dermal, Rabbit): Not available

LC50(Inhalation, Rat): 2910 g/m3 4h

Difluoromethane (CAS# 75-10-5)

LD50(Oral, Rat): Not available

LD50(Dermal, Rabbit): Not available

LC50(Inhalation, Rat): > 520000 ppm 4H

Skin corrosion/Irritation: Not classified.

Serious eye damage/irritation: Not classified

Respiratory or skin sensitization: Not classified

Germ cell mutagenicity: Not classified

Carcinogenicity: Not classified

Reproductive toxicity: Not classified

STOT- single exposure: Not classified

STOT-repeated exposure: Not classified

Aspiration hazard: Not classified

12. Ecological information

Toxicity:

Norflurane (CAS#811-97-2)

Acute toxicity		Time	Species	Method	Evaluation	Remarks
LC50	450 mg/L	96h	Fish	OECD 203	N/A	N/A
EC50	980	48h	Daphnia	OECD 202	N/A	N/A
EC50	N/A	72h	Algae	OECD 201	N/A	N/A

Difluoromethane (CAS# 75-10-5): Not readily biodegradable.

pentafluoroethane (CAS# 354-33-6): Under test conditions no biodegradation observed.

Persistence and degradability: Norflurane (CAS# 811-97-2): Negligible biodegradation after 28 days.

Difluoromethane (CAS# 75-10-5): The low octanol-water partition coefficient indicated that the product is not likely to bioaccumulate.

pentafluoroethane (CAS# 354-33-6): No appreciable bioaccumulation potential is to be expected.

Bioaccumulative potential: Norflurane (CAS# 811-97-2): R-134a will not bioconcentrate in fish and aquatic organisms.

Mobility in soil: The product is insoluble in water.

Results of PBT&vPvB assessment: The mixture does not contain any PBT / vPvB substance.

Other adverse effects: No known significant effects or critical hazards.

13. Disposal considerations

Disposal instructions Dispose of contents/container in accordance with local/regional/national/international regulations.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Basic shipping requirements:	
UN number	UN3340
Proper shipping name	REFRIGERANT GAS R 407C
Hazard class Packing	2.2
group Environmental	-
hazards	No

IATA

UN number	UN3340
UN proper shipping name	REFRIGERANT GAS R 407C
Transport hazard class(es)	2.2
Packing group	-
Environmental hazards	No

IMDG

UN number	UN3340
UN proper shipping name	REFRIGERANT GAS R 407C
Transport hazard class(es)	2.2
Packing group	-
Environmental hazards	No

15. Regulatory information

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

Norflurane (811-97-2) is found on the following regulatory lists	"US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values" List. "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory" List.
pentafluoroethane (354-33-6) is found on the following regulatory lists	"US - Hawaii Air Contaminant Limits" List. "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory" List.
Difluoromethane (75-10-5) is found on the following regulatory lists	"US - Hawaii Air Contaminant Limits" List. "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory" List.

16. Other information, including date of preparation or last revision

HMIS®ratings	Health: 2 Flammability: 1 Physical hazard: 3
NFPA ratings	Health: 2 Flammability: 1 Instability: 3
Disclaimer	The information in the sheet was written based on the best knowledge and experience currently available.
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