

1. IDENTIFICATION

Product name	Halocarbon R-422D
Commercial name:	
Synonyms	-
CAS #	See section 3
Product code	-
Product use	Synthetic/Analytical Chemistry
Manufacturer/Supplier	
Supplier (Manufacturer):	iGas USA, Inc.
Address:	8105 Anderson Road, Tampa, FL 33764
Contact Person (E-mail):	acoughlin@bmp-usa.com
Telephone:	(813) 443-0757
Fax:	(813) 886-7900
Emergency telephone Number:	Chemtrec: 1-800-424-9300

2. HAZARD(S) IDENTIFICATION

OSHA/HCS Status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
GHS Classification	
Physical hazards	Gases under pressure. Compressed gas. Liquefied gas
Health Hazards	Not classified
Environmental Hazards	Not classified
Hazard Statements	Contains gas under pressure; may explode if heated. May cause frostbite. May displace oxygen and cause rapid suffocation.
GHS Label Elements	
Hazard Pictograms	
Signal word	Warning
Precautionary Statement	
General	Read and follow all Safety Data Sheets (SDS's) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back-flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position.

Prevention	Not applicable
Response	Not applicable
Storage	Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.
Disposal	Not applicable.
Hazards Not Otherwise Classified	Liquid can cause burns similar to frostbite.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS#	Percent
Pentafluoroethane	354-33-6	65.1%
1,1,1,2 - tetrafluoroethane	811-97-2	31.5%
Isobutane	75-28-5	3.4%

4. FIRST-AID MEASURES

First aid procedures

Eye contact

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Skin contact

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband

Ingestion

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if adverse health effects persist or are severe. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. As this product rapidly becomes a gas when released, refer to the inhalation section.

Notes to physician

Treat symptoms.

Most Important Symptoms/Effects, Acute and Delayed

Potential Acute Health Effect:

Eye Contact	Liquid can cause burns similar to frostbite.
Inhalation	No known significant effects or critical hazards
Skin Contact	Derma contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
Frostbite	Try to warm up the frozen tissues and seek medical attention.
Ingestion	Ingestion of liquid can cause burns similar to frostbite.

Potential Acute Health Effects

Eye Contact	Adverse symptoms may include the following: Frostbite
Inhalation	No specific data.
Skin Contact	Adverse symptoms may include the following: Frostbite
Ingestion	Adverse symptoms may include the following: Frostbite

Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary:

Notes to Physician	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific Treatments	No specific treatment
Protection of First-Aid Responders	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

5. FIRE FIGHTING MEASURES

Flammable properties	Flammable.
Extinguishing media	
Suitable extinguishing media:	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media:	None known.
Specific hazards arising from the chemical:	Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
Hazardous thermal decomposition products:	Decomposition products may include the following materials: carbon dioxide, carbon monoxide, halogenated compounds
Special protective actions for fire fighters:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
Firefighting equipment/instructions	Firefighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For Non-Emergency Personnel

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protection equipment.

For Emergency Responders

If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For Non-Emergency Personnel".

Environmental Precautions

Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and Material for Containment and Cleaning Up

Small Spills

Immediately contact emergency personnel. Stop leak if without risk.

Large Spills

Immediately contact emergency personnel. Stop leak if without risk.

Note: See Section 1 for emergency contact information and Section 13 for waste disposal.

7. HANDLING AND STORAGE

Handling

Avoid inhalation of high concentrations of vapours. 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:

None

- Appropriate Engineering Controls:** Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental Exposure Controls:** Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual Protection Measures

Hygiene Measures

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. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye / Face Protection

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Hand Protection

Chemical-resistant, impervious glove complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body Protection

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory Protection

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Other Skin Protection

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risk involved and should be approved by a specialist before handling this product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state	Gas [Liquified gas]
Color	Not available
Odor	Not available
Odor threshold	Not available
pH	Not available
Vapor Pressure	Not available
Vapor Density	Highest known value: 4.2 (Air = 1) (Pentafluoroethane). Weighted Average: 3.9 (Air = 1)
Melting Point/Freezing Point	-103°C (-153.4°F) This is based on data for the following ingredient: Pentafluoroethane. Weighted average: -106.51°C (-159.7°F)
Critical Temperature	Lowest known value: 72.4°C (162.3°F) (Pentafluoroethane)
Flash Point	Not available
Burning Time	Not applicable
Burning Rate	Not applicable
Evaporation rate	Not available
Flammability (solid, gas)	Not available
Lower/Upper Explosion limits	Not available
Relative density	Not applicable
Solubility	Not available
Solubility in Water	Not available
Partition Coefficient	n-octanol/water: Not available
Auto-Ignition Temperature	Not available
Decomposition temperature	Not available
SADT	Not available
Gas Density (lb/ft ³)	Weighted average: 0.3
Viscosity	Not available

10. STABILITY AND REACTIVITY

Reactivity	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	This product is stable.
Possibility of Hazardous Reactions	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to Avoid	No specific data.
Incompatible with Various Substances	Highly reactive or incompatible with the following materials: alkalis
Hazardous Decomposition Products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous Polymerization	Under normal conditions of storage and use, hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects:

Acute Toxicity:	Not available
Irritation/Corrosion:	Not available
Sensitization	Not available
Mutagenicity	Not available
Carcinogenicity	Not available
Reproductive Toxicity	Not available
Teratogenicity	Not available

Specific Target Organ Toxicity

Single Exposure	Not available
Repeated Exposure	Not available

Aspiration Hazard Not available

Information on the likely routes of exposure Not available

Potential Acute Health Effects

Eye Contact	Liquid can cause burns similar to frostbite.
Inhalation	No known significant effects or critical hazards.
Skin Contact	Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
Ingestion	Ingestion of liquid can cause burns similar to frostbite.

Delayed and immediate effects and also chronic effects from short- and long-term exposure

Short Term Exposure

Potential immediate effects	Not available
Potential delayed effects	Not available

Long Term Exposure

Potential immediate effects	Not available
Potential delayed effects	Not available

Potential chronic health effects Not available

General	No known significant effects or critical hazards.
Carcinogenicity	No known significant effects or critical hazards.
Mutagenicity	No known significant effects or critical hazards.
Teratogenicity	No known significant effects or critical hazards.
Developmental effects	No known significant effects or critical hazards.
Fertility effects	No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates Not available.

12. ECOLOGICAL INFORMATION

Toxicity Not available.
Persistence and degradability Not available.
Bioaccumulative potential Not available.

Mobility in soil

Soil/Water partition coefficient (Koc) Not available.
Other adverse effects No known significant effects or critical hazards.

13. DISPOSAL CONSIDERATIONS

Disposal methods The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional and local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty iGas USA-owned pressure vessels should be returned to iGas USA, 8105 Anderson Road, Tampa, FL 33634. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not Puncture or incinerate container.

14. TRANSPORT INFORMATION

	DOT	TDG	MEXICO	IMDG	IATA
UN Number	UN3163	UN3163	UN3163	UN3163	UN3163
UN Proper Shipping Name	LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Iso-butane)	LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Iso-butane)	LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Iso-butane)	LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Iso-butane)	LIQUEFIED GAS, N.O.S. (Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, Iso-butane)
Transport Hazard Class(s)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing Group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional Information	-	Explosive Limit and Limited Quantity Index 0.125 Passenger Carrying Road or Rail Index 75	-	-	-

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Special precautions for user

Transport within user’s premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not available.

15. REGULATORY INFORMATION

U.S. Federal Regulations

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

United States Inventory (TSCA 8b): All components are listed or exempted.

Clean Air Act (CAA) 112 regulated flammable substances: Isobutane

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPS)

Not Listed

Clean Air Act Section 602 Class I Substances

Not Listed

Clean Air Act Section 602 Class II Substances

Not Listed

DEA List I of Chemicals (Precursor Chemicals)

Not Listed

DEA List II Chemicals (Essential Chemicals)

Not Listed

SARA 304 RQ

Not applicable

SARA 311/312 Classification

Sudden release of pressure

Composition/Information on Ingredients

No products were found

State Regulations

Massachusetts

The following components are listed: ISOBUTANE

New York

None of the components are listed.

New Jersey

The following components are listed: Isobutane; PROPANE, 2-METHYL-

Pennsylvania

The following components are listed: PROPANE, 2-METHYL-

Canada Inventory

All components are listed or exempted.

International Regulations

International Lists

Australia Inventory (AICS): All components are listed or exempted.

China Inventory (IECSC): All components are listed or exempted.

Japan Inventory: All components are listed or exempted.

Korea Inventory: All components are listed or exempted.

Malaysia Inventory (EHS Register): Not determined.

New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.

Philippines Inventory (PICCS): All components are listed or exempted.

Taiwan Inventory (CSNN): Not determined.

Chemical Weapons

Convention List Schedule I Chemicals Not listed.

Chemical Weapons

Convention List Schedule II Chemicals Not Listed.

Chemical Weapons

Convention List Schedule III Chemicals Not Listed.

Canada

WHMIS (Canada)

Class A: Compressed gas.

CEPA Toxic Substances: The following components are listed: Volatile organic compounds; Volatile organic compounds.

Canadian ARET: None of the components are listed.

Canadian NPRI: The following components are listed: Volatile organic compounds; Volatile organic compounds; Butane (all isomers).

Alberta Designated Substances: None of the components are listed.

Ontario Designated Substances: None of the components are listed.

Quebec Designated Substances: None of the components are listed.

Class A: Compressed Gas.

Canada Label Requirements

California Proposition 65

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

16. OTHER INFORMATION

HMIS® ratings

Health: 1
Flammability: 1
Physical hazard: 1

NFPA ratings

Health: 2
Flammability: 1
Instability: 0

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