

SAFETY DATA SHEET

1. Product and Company Identification

Product Name: Refrigerant Gas R413A

Distributor: National Refrigerants of America Ltd.
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2. Composition/Information on Ingredients

Chemical Nature: Blend of HFC134a, HFC 218 and HC 600a

<u>Component</u>	<u>CAS No.</u>	<u>EINECS No.</u>	<u>Weight %</u>
1,1,1,2-Tetrafluoroethane (HFC134a)	811-97-2	212-337-0	88
Octofluoropropane (HFC 218)	76-19-7	200-941-9	9
2-Methylpropane (HC 600a)	76-19-7	200-857-2	3

3. Hazard Identification

Colourless, volatile liquid with ethereal and faint sweet odour. Non-flammable material. Overexposure may cause dizziness and loss of concentration. At higher levels CNS depression and cardiac arrhythmia may result from exposure. Vapour displaces air and can cause asphyxiation in confined spaces. At higher temperatures (>250°C) decomposition products may include Hydrofluoric Acid (HF) and carbonyl halides.

Potential Health Hazard

Skin: Irritation would result from a defatting action on tissue. Liquid contact could cause frostbite.

Eyes: Liquid contact can cause sever irritation and frostbite. Mist may irritate.

Inhalation: When oxygen levels in air are reduced to 12 -14% by displacement, symptoms of

asphyxiation, loss of coordination, increased pulse rate and deeper respiration will occur. At high levels cardiac arrhythmia may occur.

Ingestion: Ingestion is unlikely because of the boiling point of the material. Should it occur then discomfort in the gastrointestinal tract from the rapid evaporation of the material, and the consequent evolution of gas, would result.

4. First Aid Measures

Skin: Promptly flush with water for at least 15 minutes. 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. Get medical attention if symptoms persist.

Eyes: Immediately flush eyes with large amounts of water for at least 15 minutes (in case of frostbite water should be lukewarm, not hot) lifting eyelids occasionally to facilitate irrigation. Get medical attention.

Inhalation: Immediately remove to fresh air. If breathing has stopped, give artificial respiration. Use oxygen as required, provided a qualified operator is available. Get medical attention. Do not give epinephrine (adrenaline).

Ingestion: Ingestion is unlikely because of the physical properties of the material, and is not expected to be hazardous. Do not induce vomiting unless instructed to do so by a physician.

Advice to Physician: Because of the possible disturbance 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.

5. Fire Fighting Measures

Extinguishing Media: All extinguishing agents are suitable. Use any standard agent – chose the most appropriate for type of surrounding fire (the material itself is not flammable).

Specific Hazard: Pressurised container. On heating there is a risk of bursting due to internal pressure build-up. At high temperatures thermal decomposition gives toxic vapours – Hydrofluoric Acid (HF) and carbon oxides.

Specific fire fighting methods: Stay upwind. Evacuate the personnel away from the fumes. Cool down the containers/equipment exposed to heat with water spray.

Protection of the fire fighters: Wear a self-contained breathing apparatus and a protective suit.

6. Accidental Release Measures

Personal Precautions: Avoid contact with skin and eyes. Do not breathe the gas. No naked flames. DO NOT smoke. Wear personal protective equipment (see Section 8, “Exposure controls/ personal protection”).

Vapour is heavier than air. Shut off low-level openings in the vicinity (ventilation shafts, drains etc.). Prevent the product from entering cellars, basements since the vapour may create a suffocating atmosphere. Stop the leak. Ventilate the spillage area. Ventilate enclosed areas, basements, pits etc.

7. Handling and Storage

Handling: Avoid breathing the vapour. Avoid liquid contact with the eyes, skin or clothing. Do not puncture or drop the cylinders. Do not expose them to open flame or excessive heat. Follow standard precautions for handling and use of compressed gas cylinders.

Storage: Store in a cool, well-ventilated area of low fire risk and out of sunlight. Protect cylinders and fittings from physical damage. Storage in subsurface locations should be avoided. Close valve tightly after use and when empty.

Technical Measures: The vapour is heavier than air. Storage area should be equipped with low level ventilation. High concentrations may be produced at low levels where general ventilation is poor. In such cases provide adequate ventilation or wear suitable respiratory equipment with positive air supply.

For correct refrigerant composition system should be charged using the liquid phase not vapour phase. Liquid refrigerant transfers between containers and to and from system can result in static charge generation. Ensure adequate earthing.

Packaging Material: Recommended: Steel
To be Avoided: Alloys containing more than 2% magnesium.
Plastic materials.

8. Exposure Controls & Personal Protection

Engineering Control: Provide local ventilation at filling zones and areas where leakage is probable. Mechanical (general) ventilation may be adequate for other operating and storage areas.

Personal Protective Equipment

Skin Protection: Skin contact with refrigerant may cause frostbite. General work clothing and gloves (leather) should provide adequate protection. If prolonged contact with the liquid or gas is anticipated, insulated gloves constructed of PVA, neoprene or butyl rubber should be used. Any contaminated clothing should be promptly removed and washed before reuse.

Eye Protection: For normal conditions wear safety glasses. Where there is a reasonable probability of liquid contact wear chemical safety goggles.

Respiratory Protection: None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, or release in confined space, where the concentration is above 1000 ppm use self contained approved breathing apparatus or supplied respirator.

Additional Recommendations: Where contact with liquid is likely, such as in a spill or leak, impervious boots and clothing should be worn. High dose-level warning signs are recommended for areas of principal exposure. Provide eyewash stations and quick drench shower facilities at convenient locations. For tank cleaning operations ventilate the tank and do gas entry tests before entering. Follow working in confined spaces regulations.

Occupational Exposure Limits: The OES (8 hr TWA reference period) for 1, 1, 1, 2-Tetrafluoroethane (HFC134a) is 1000 ppm (4240 mg/m³). Octafluoropentane (R218) and 2-Methylpropane (R600a) exposure limits are not available.

9. Physical and Chemical Properties

Appearance: Clear, colourless liquid and vapour.
Physical State: Gas at ambient pressure and temperature.

Chemical Formula:	1,1,1,2 – Tetrafluoroethane (R-134a)	CHF ₃ -CH ₂ F
	Octofluoropropane (R218)	CF ₃ -CF ₂ -CF ₃
	2-Methylpropane (R600a)	CH (CH ₃) ₃
Odour:	Faint ethereal odour.	
Density:	1188 kg/m ³ at 25°C	
pH	Not Applicable	
Boiling Point:	-35°C	
Freezing Point:	Not Determined	
Vapour Pressure:	7.85 BarA at 25	
Vapour Density (Air =1.0)		

10. Stability and Reactivity

Stability: Stable at ambient temperature and under normal conditions of use.

Hazardous Reactions: May decompose on contact with hot surfaces and flames. Incompatible with alkali metals, finely divided metals, magnesium and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metals, alkaline earth metals, sodium, potassium and barium.

Hazardous decomposition products: On contact with very hot surfaces, or flames, thermal decomposition (Pyrolysis) releases toxic gasses (hydrofluoric acid and possibly carbonyl halides).

11. Toxicological Information

Acute Toxicity:

HFC134a LC₅₀: 4 hr. (rat) - > 500 000 ppm / Cardiac Sensitization threshold (dog) > 80 000 ppm

HFC 218 LC₅₀ 1 hr (rat) Inhalation: > 800 000 ppm

HC 600a LC₅₀ 2 hr (rat) Inhalation: > 520 000ppm

Acute Symptoms: Effects following inhalation: Headaches, dizziness, loss of consciousness. Possible effects following high exposure: Cardiac disorders, possible cardiac arrest.

Local Effects: Contact with liquefied gas causes frostbite, 1,1,1,2 – Tetrafluoroethane is slightly irritating to rabbits on coetaneous application and not irritating on ocular application (vapours). Contact with liquefied gas causes injury to the cornea.

12. Ecological Information

Behaviour in the environment: Mobility: Product is volatile when in aqueous solution.

13. Disposal Considerations

Destruction/Disposal: Consult the manufacturer or supplier for information regarding recovery and recycling of the product. If recovery is not possible incinerate at a licensed installation.

Prohibition: Do not allow the product to be released to the environment.

Contaminated Packaging:

Decontamination/Cleaning: Degas.

Destruction/Cleaning: Reusable containers to be returned to the supplier. Non-reusable (Disposable) containers to be disposed of as hazardous waste at an approved hazardous or special waste collection

point or returned to the supplier for disposal.

14. Transport Information

UN No.:	1078
Air Transport (ICAO/IATA)	
Class:	2.2
Proper Shipping Name:	Refrigerant Gas N.O.S. (1,1,2 – Tetrafluoroethane, Octofluoropropane, 2 – Methyl propane)
Sea Transport (IMDG)	
Class:	2.2
Marine Pollutant:	Not classified as Marine Pollutant
Proper Shipping Name:	Refrigerant Gas N.O.S. (1,1,2 – Tetrafluoroethane, Octofluoropropane, 2 – Methyl propane)
Road Transport (ADR)	
UN No.	1078
Class:	2
Classification Code:	2A
Hazard Identification No.	20
Proper Shipping Name:	Refrigerant Gas N.O.S. (1,1,2 – Tetrafluoroethane, Octofluoropropane, 2 – Methyl propane)

15. Regulatory Information

Risk Phrases: No risk phrases.

Safety Phrases:

- S47: Keep at temperature not exceeding 45°C.
S41: In case of fire and/or explosion do not breathe fumes.
S24/25: Avoid contact with skin and eyes.

United Kingdom: Handle in accordance with relevant British Legislation e.g. Health and Safety at Work Act 1974, Environment Protection Act 1990.

Note: The regulatory information given above only indicates the principal regulations specifically applicable to the product described in the Safety Data Sheet. The user's attention is drawn to the possible existence of additional provisions, which complete these regulations. Refer to all applicable National, International and Local regulations or provisions.

16. Other Information

Uses: Refrigerant.

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