

Refrigerant Solutions Limited

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1 February 2006

PRODUCT SAFETY DATA SHEET

PRODUCT: **RS-44 (R424A)**

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

1.1 Identification of the preparation: **RS-44**

1.2 Company

Refrigerant Solutions Limited
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1.3 Emergency telephone number: +44 (0)161 926 9876

1.4 E-mail: rs@refsols.com
Web site: www.ref-sols.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No
Pentafluoroethane	354-33-6
1,1,1,2-tetrafluoroethane	811-97-2
iso-Pentane	78-78-4
Butane	106-97-8
Isobutane	75-28-5

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3. HAZARDS IDENTIFICATION

Liquefied gas: May cause frostbite to skin and eyes.

4. FIRST-AID MEASURES

Eyes: If substance has got into the eyes immediately wash out with plenty of water for at least 15 minutes. Keep eye wide open while rinsing.

Skin: May cause frostbite. Wash frost-bitten area immediately with plenty of water. Do not remove clothing. Wash affected skin with warm water. If skin irritation persists, call a physician.

Inhalation: Move to fresh air in case of accidental inhalation of vapours. Oxygen or artificial respiration if needed. Do not apply artificial respiration if patient is breathing. Consult a physician after significant exposure. Do not give adrenaline or similar drugs.

Ingestion: Do not induce vomiting without medical advice. Call a physician immediately. Do not give drugs from adrenaline-ephedrine group.

General advice: Consult a physician for severe cases.

5. FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media:

The product itself does not burn. Extinguish with carbon dioxide, dry chemical, foam or water spray, as appropriate for surrounding area.

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5.2 Extinguishing media which must not be used for safety reasons :

None

5.3 Specific hazards:

Possibility of generating hazardous reactions during a fire due to the presence of F groups. Fire or intense heat may cause violent rupture of packages.

5.4 Special protection equipment for fire fighters:

In the event of fire, wear self-contained breathing apparatus. Suitable protective clothing.

5.5 Specific methods:

Standard procedure for chemical fires. In the event of fire, cool exposed containers with water spray.

6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions:

Use Personal protective equipment. Evacuate personnel to safe areas. Ensure adequate ventilation. Avoid contact with skin, eyes and inhalation of vapour.

6.2 Methods for cleaning up:

Shut off leaks if without risk. Let the liquid evaporate. Ensure adequate ventilation.

7. HANDLING AND STORAGE

7.1 Handling: Provide sufficient air exchange and/or exhaust in work rooms. Do not puncture or drop container.

7.2 Storage: Keep containers tightly closed in a cool, dry well-ventilated place away from direct sunlight. Keep away from heat and sources of ignition.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- 8.1 Engineering measures: Ensure adequate ventilation, especially in confined areas.
- 8.2 Personal protection equipment:
- Respiratory protection: In case of insufficient ventilation wear suitable respiratory equipment, preferably a compressed airline breathing apparatus.
 - Hand protection: Impervious gloves (butyl rubber).
 - Eye protection: Wear as appropriate: safety glasses, goggles. Wear face-shield and protective suit for abnormal processing problems.
 - Skin and body protection: Chemical resistant apron, long sleeved clothing, safety shoes.
- 8.3 Exposure limit: Occupational Exposure Limit 1000 ppm (TWA) .

9. PHYSICAL AND CHEMICAL PROPERTIES

- 9.1 Appearance: Compressed liquefied gas
- 9.2 Colour: Colourless
- 9.3 Odour: Very faint ether-like
- 9.4 Boiling point/range: -38.7°C
- 9.5 Critical temperature: 88.8°C
- 9.6 Critical pressure: 4040 kPa

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9.7	Vapour pressure:	967 kPa at 25°C
9.8	Liquid density:	1169 kg/m ³ at 25°C
9.9	Water solubility:	Insoluble
9.10	Flash point:	Not applicable
9.11	Flammability:	Not applicable
9.12	Explosion limit:	Not applicable
9.13	Auto-ignition temperature:	Not determined

10. STABILITY AND REACTIVITY

10.1	Stability:	Stable at normal conditions. No decomposition if stored and applied as directed.
10.2	Conditions to avoid:	Fire/sources of heat.
10.3	Materials to avoid:	Strong oxidising agents, alkali metals, alkaline earth metals, finely divided aluminium.
10.4	Hazardous decomposition products:	Hydrogen fluoride by thermal decomposition and hydrolysis.

11. TOXICOLOGICAL INFORMATION

11.1	Acute toxicity:	HFC 125 : LC 50 inhalation (Rat)/4h:>800,000 ppm HFC 134a : LC 50 inhalation (Rat)/4h:>500,000 ppm iso-Pentane: LC50 inhalation (Rat) 4100 ppm 12300 mg/M3 Butane: LC50 inhalation (Rat)4h, 658.000 ppm
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11.2 Irritation:

- Skin: slightly irritating, may cause frostbite
- Eyes: slightly irritating

12 ECOLOGICAL INFORMATION

Behaviour in the environment:

Mobility: Product is volatile when not under pressure.

Persistence/degradability: All the components decompose comparatively rapidly in the lower atmosphere and all have relatively short atmospheric lifetimes demonstrated below:

HFC 134a	14.6 years
HFC 125	32.6 years
Iso-Pentane	approximately 10 years
Butane	approximately 10 years
Isobutane	approximately 10 years

Bioaccumulation: Not bioaccumulable.

Destination of the product:

Effects on the aquatic environment:

Discharge of the product will enter the atmosphere. No long term aqueous contamination due to low solubility.

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13. DISPOSAL CONSIDERATIONS

Waste treatment: Refrigerant Solutions Limited will take back product for reclamation provided RS-44 has not been mixed with any other products. If RS-44 is mixed with other refrigerants, the mixture can be destroyed by high temperature incineration in an approved facility capable of absorbing and neutralising the by-products.

14. TRANSPORT INFORMATION

- 14.1 International regulations: UN number: 1078
- Rail/road (RID/ADR) : Class: 2
Item number: 2°A
Hazard identification number: 20
Labelling: 2
- Sea (IMO/IMDG): Class: 2.2
Labelling: Gaz comprime flammable
Not classified as a marine pollutant
- Air (ICAO-IATA): Class: 2.2
Labelling: Non-flammable gas
- 14.2 United Kingdom: Rail/road: Substance Identification number: 1078
- 14.3 Note: Given the possible evolution of transport regulations for hazardous materials, it is recommended to check their validity

15 REGULATORY INFORMATION

Classification according to European Directive on classification of hazardous preparations 88/379/EEC. Not classified as dangerous. The product does not need to be labelled in accordance with EC directives.

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R-phrases: No R-phrases

S-phrases: S7/9 – Keep container tightly closed in a well-ventilated place
S24/25 – Avoid contact with skin and eyes
S47 – Keep at temperature not exceeding 50⁰C
S51 – Use only in well ventilated areas
S61 – Avoid release to the environment.

16. OTHER INFORMATION

The information provided in this Product 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.