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

Product Name LOW TEMPERATURE REFRIGERANT MU-N702 (FLAMMABLE)

Manufacturer
PHC Corporation
1-1-1 Sakada Oizumi-Machi Ora-Gun, Gunma 370-0596, Japan

Emergency Phone No. Tel: +81 276 61 8061

Use Subject to Member State regulations, applicable uses are: refrigerant

2. HAZARDS IDENTIFICATION

Extremely flammable liquefied gas.
Low acute toxicity. High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anaesthetic effects and asphyxiation.
Liquid splashes or spray may cause freeze burns to skin and eyes.

EC Classification EXTREMELY FLAMMABLE

3. COMPOSITION / INFORMATION ON INGREDIENTS

Alternative names Mixture of refrigerants for low temperature refrigeration.

Product Description Flammable mixture of hydrofluorocarbons, perfluorocarbons and hydrocarbons.

This MSDS covers grades: MU-N702

HAZARDOUS INGREDIENT(S)

Hazardous ingredient(s)	%(w/w)	CAS No.	EC No.	EC Classification
1,1,1,3,3-Pentafluoropropane (HFC 245 fa)	40 - 43	000460-73-1	419-170-6	
Butane	17 - 19	000106-97-8	203-448-7	F+ R12
Trifluoromethane (HFC 23)	29 - 32	000075-46-7	200-872-4	
Tetrafluoromethane (PFC 14)	9 - 11	000075-73-0	200-896-5	

4. FIRST AID MEASURES

The first aid advice given for skin contact, eye contact, and ingestion is applicable following exposures to the liquid or spray.
See also section 11.

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.
Skin Contact	Thaw affected areas 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.
Eye Contact	Immediately irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 10 minutes. Obtain immediate medical attention.
Ingestion	Unlikely 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.
Further Medical Treatment	Symptomatic treatment and supportive therapy as indicated. Adrenaline and similar sympathomimetic drugs should be avoided following exposure as cardiac arrhythmia may result with possible subsequent

5. FIRE-FIGHTING MEASURES

General	Extremely flammable. Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions. Combustion or thermal decomposition will evolve very toxic and corrosive vapours. (hydrogen fluoride) Containers may burst if overheated.
Extinguishing Media	Allow gas fires to burn until exhausted. Keep fire exposed containers cool by spraying with water.
Fire Fighting Protective Equipment	A self contained breathing apparatus and full protective clothing must be worn in fire conditions. See Also Section 8

6. ACCIDENTAL RELEASE MEASURES

Personal Protection	Ensure suitable personal protection (including respiratory protection) during removal of spillages. See Also Section 8.
General	Eliminate sources of ignition. 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. Prevent liquid from entering drains, sewers, basements and workpits since the vapour may create an explosive or suffocating atmosphere.

7. HANDLING AND STORAGE

Handling	Keep away from sources of ignition - No Smoking. Take precautionary measures against static discharges. 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 vapour 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 between the liquid and skin and eyes. Avoid venting to atmosphere. This fluorinated greenhouse gas may be supplied in returnable containers (cylinders). The container contains fluorinated greenhouse gases covered by the Kyoto Protocol. The fluorinated greenhouse gases in containers may not be vented to the atmosphere. Regulation (EC) No. 842/2006 of the European Parliament and the Council on
Process Hazards	Liquid refrigerant transfers between refrigerant containers and to and from systems can result in static generation. Ensure adequate earthing. Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions. Care must be taken to mitigate the risk of developing high pressures in systems caused by a temperature rise when liquid is trapped between
Storage	Keep in a well ventilated place away from fire risk and avoid sources of heat such as electric or steam radiators. Avoid storing near to the intake of air conditioning units, boiler units and open drains.
Specific use	Subject to Member State regulations, applicable uses are: refrigerant

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General

Wear suitable protective clothing, gloves and eye/face protection.
Wear thermal insulating gloves when handling liquefied gases.
In cases of insufficient ventilation, where exposure to high concentrations of vapour is possible, suitable respiratory protective equipment with positive air supply should be used.

Eye Protection

Gloves

Occupational Exposure Limits

Occupational Exposure Limits	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m³)	STEL (ppm)	STEL (mg/m³)	Note:
1,1,1,3,3-Pentafluoropropane (HFC 245 fa)	000460-73-1	300	-	-	-	AIHA WEEL

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	liquefied gas
Colour	colourless
Odour	slight ethereal
Solubility (Water)	marginally soluble
Solubility (Other)	soluble in: most organic solvents

10. STABILITY AND REACTIVITY

Hazardous Reactions

Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions.
Incompatible materials: finely divided metals, magnesium and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals - sodium, potassium, barium. May react violently with oxidising agents.

Hazardous Decomposition

hydrogen fluoride by thermal decomposition and hydrolysis.

11. TOXICOLOGICAL INFORMATION

Inhalation	High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anaesthetic effects and asphyxiation.
Skin Contact	Liquid splashes or spray may cause freeze burns. Unlikely to be hazardous by skin absorption.
Eye Contact	Liquid splashes or spray may cause freeze burns.
Ingestion	Highly unlikely - but should this occur freeze burns will result.
Long Term Exposure	The component in this refrigerant blend of most toxicological significance is HFC 245 fa (1,1,1,3,3-pentafluoropropane). Rats exposed to HFC-245 vapour for up to 13 weeks at levels as high as 50 000 ppm showed only minimal signs of toxicity. These consisted of an increase in urinary output, some alterations in clinical chemistry parameters (possibly related to increased urine volume), and at 10 000 ppm and 50 000 ppm a mild inflammation of the myocardium (heart muscle). The no-observed adverse effect level (NOAEL) was 2 000 ppm. In developmental toxicity studies with rats, HFC 245fa was not teratogenic, causing no foetal effects at inhalation concentrations of up to 50 000 ppm, the highest level tested. In genetic testing, HFC-245fa was not mutagenic in an Ames assay. In a human lymphocyte chromosome aberration assay, it was weakly positive without metabolic activation and inactive with metabolic activation. The substance was inactive in a mouse micronucleus assay, in which mice were exposed to 100 000 ppm

12. ECOLOGICAL INFORMATION

Environmental Fate and Distribution	The product is a gas. Low tonnage material produced in open systems.
Persistence and Degradation	Does not deplete ozone. This refrigerant blend has a Global Warming Potential (GWP) greater than 1000 (relative to a value of 1 for carbon dioxide at 100 years) according to Annex I of Regulation 842/2006 on certain fluorinated greenhouse gases. Values in Annex I are taken from the third assessment report (TAR) of the intergovernmental Panel on Climate Change (2001 IPCC GWP Values).
Effect on Effluent Treatmer	Discharges of the product will enter the atmosphere and will not result in long term aqueous contamination.

13. DISPOSAL CONSIDERATIONS

Recommended:	Best to recover and recycle. If this is not possible, destruction is to be in an approved facility which is equipped to absorb and neutralise acid gases and other toxic processing products.

14. TRANSPORT INFORMATION

Forbidden for transport by passenger aircraft.

Hazard Label

Road/Rail

UN No.	3161
ADR/RID Class	2.1
ADR/RID Proper Shipping Name	LIQUEFIED GAS, FLAMMABLE, N.O.S. (CONTAINS BUTANE)

SEA

IMDG Class	2.1
Marine Pollutant	Not classified as a Marine Pollutant

AIR

ICAO/IATA	2.1

15. REGULATORY INFORMATION

European Regulations

Hazard Symbol	F+
Risk Phrases	R12 Extremely flammable.
Safety Phrases	S9 Keep container in a well ventilated place. S16 Keep away from sources of ignition - No Smoking. S33 Take precautionary measures against static discharges.
EC Classification	EXTREMELY FLAMMABLE
Special Restrictions:	This fluorinated greenhouse gas may be supplied in returnable containers (cylinders). The container contains fluorinated greenhouse gases covered by the Kyoto Protocol. The fluorinated greenhouse gases in containers may not be vented to the atmosphere. Regulation (EC) No. 842/2006 of the European Parliament and the Council on certain fluorinated greenhouse gases.

16. OTHER INFORMATION

This data sheet was prepared in accordance with Regulation (EC) No. 1907/2006.

Information in this publication is believed to be accurate and is given in good faith, but it is for the User to satisfy itself of the suitability for its own particular purpose. Accordingly, PHC Corporation gives no warranty as to the fitness of the Product for any particular purpose and any implied warranty or condition (statutory or otherwise) is excluded except to the extent that such exclusion is prevented by law.

Glossary

AIHA WEEL:	American Industrial Hygiene Association Workplace Environmental Exposure Level.
WEL:	Workplace Exposure Limit (UK HSE EH40)
COM:	The company aims to control exposure in its workplace to this limit
TLV:	The company aims to control exposure in its workplace to the ACGIH limit
TLV-C:	The company aims to control exposure in its workplace to the ACGIH Ceiling limit
MAK:	The company aims to control exposure in its workplace to the German limit
Sk:	Can be absorbed through skin
Sen:	Capable of causing respiratory sensitisation
Bmgv:	Biological monitoring guidance value (UK HSE EH40)

Risk Phrases

R12 Extremely flammable.