Material Safety Data Sheet

R -401B

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

Corporate MSDS Number : TAB-00116

Product Use

Refrigerant

Trade names and Synonyms

R-401B

Company Identification

TABRIGAS EGYPT – PACKAGER / DISTRIBUTOR

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
Chlorodifluoromethane (HCFC-22)	75-45-6	61 %
1-Chloro-1, 2, 2, 2-tetrafluoroethane (HCFC-124)	2837-89-0	28 %
1, 1-Difluoroethane (HFC-152a)	75-37-6	11 %

HAZARDS IDENTIFICATION

Emergency Overview

Misuse or intentional inhalation abuse may lead to death without warning.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Rapid evaporation of the liquid may cause frostbite

Potential Health Effects

Skin

Contact with liquid or refrigerated gas can cause cold burns and frostbite.

Eyes

Contact with liquid or refrigerated gas can cause cold burns and frostbite.

Inhalation

Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.
Other symptoms potentially related to misuse or inhalation abuse is:
Anesthetic effects, Light-headedness, dizziness, confusion, in coordination, drowsiness, or unconsciousness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Carcinogenicity

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

FIRST AID MEASURES

First Aid

Skin contact

In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Take off all contaminated clothing immediately. Consult a physician. Wash contaminated clothing before re-use. Treat for frostbite if necessary by gently warming affected area.

Eye contact

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician if necessary.

Inhalation

Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.

Ingestion

Is not considered a potential route of exposure

General advice

Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.

Notes to physician

Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point	: does not flash
Ignition temperature	: 685 °C (1,265 °F)
Lower explosion limit	: Method: None per ASTM E681
Upper explosion limit	: Method: None per ASTM E681

Fire and Explosion Hazard :

Cylinders are equipped with pressure and temperature relief devices, but may still rupture under fire conditions. Decomposition may occur. Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and colour of the torch flame. This flame effect will only occur in concentrations of product well above the recommended exposure limit. Therefore stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames.

This substance is not flammable in air at temperatures up to 100 deg. C (212 deg. F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than

that in air). Whether a mixture containing this substance and air, or this substance in an oxygen enriched atmosphere become combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other purposes. Experimental data have also been reported which indicate combustibility of this substance in the presence of certain concentrations of chlorine.

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding Environment.

Firefighting Instructions

Cool containers / tanks with water spray. Self-contained breathing apparatus (SCBA) is required if containers rupture and contents are released under fire conditions.

ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Accidental Release Measures

Ventilate area, especially low or enclosed places where heavy vapors might collect. Self-contained breathing apparatus (SCBA) is required if a large release occurs. Avoid open flames and high temperatures.

HANDLING AND STORAGE

Handling (Personnel)

Avoid breathing vapors or mist. Avoid contact with skin and eyes. Use sufficient ventilation to keep employee exposure below recommended limits.

Storage

Store in a clean, dry place. Do not heat above 52º C (125º F).

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use sufficient ventilation to keep employee exposure below recommended limits. Local exhaust should be used when large amounts are released.

Mechanical ventilation should be used in low or enclosed places. Refrigerant concentration monitors may be necessary to determine vapor concentrations in work areas prior to use of torches or other open flames, or if employees are entering enclosed areas.

Personal Protective Equipment

Respiratory protection

Under normal manufacturing conditions, no respiratory protection is required when using this Product.

Hand protection

Additional protection: Impervious gloves

Eye protection

Wear safety glasses or coverall chemical splash goggles. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

Protective measures

Self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Guidelines

Exposure Limit Values

Chlorodifluoromethane			
TLV	((ACGIH))	1,000 ppm	TWA
1-Chloro-1, 2, 2, 2-tetrafluoroethane			
AEL *	(DUPONT)	1,000 ppm	8 & 12 hr. TWA
1, 1-Difluoroethane			
AEL *	(DUPONT)	1,000 ppm	8 & 12 hr. TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL AND CHEMICAL PROPERTIES

Form	: Liquefied gas
Color	: colorless
Odor	: slight, ether-like
pH	: neutral
Boiling point	: -34.6 °C (-30.3 °F)
% Volatile	: 100 %
Vapor Pressure	: 8,224 hPa at 25 °C (77 °F)
Specific gravity	: 1.19 at 25 °C (77 °F)
Water solubility	: 1.0 g/l at 25 °C (77 °F) at 1,013 hPa
Vapor density	: 3.3 at 25°C (77°F) and 1013 hPa (Air=1.0)
Evaporation rate	: > 1 (CCL4=1.0)

STABILITY AND REACTIVITY

Stability

Stable at normal temperatures and storage conditions.

Conditions to Avoid

Avoid open flames and high temperatures.

Incompatibility

Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts

Hazardous decomposition products

Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids, and possibly carbonyl halides. These materials are toxic and irritating. Avoid contact with decomposition products

Hazardous reactions

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Chlorodifluoromethane (HCFC-22)

Dermal:

Not applicable

Oral:

Not applicable

Inhalation 4 h LC50:

220000 ppm , rat

Inhalation:

Dog Cardiac sensitization

Skin irritation:

No skin irritation, rabbit
Not expected to cause skin irritation based on expert review of the properties of the substance.

Eye irritation:

No eye irritation, rabbit
Not expected to cause eye irritation based on expert review of the properties of the substance.

Skin sensitization:

Did not cause sensitization on laboratory animals. guinea pig
Not expected to cause sensitization based on expert review of the properties of the substance.

Repeated dose toxicity:

Inhalation
Mouse
No toxicologically significant effects were found.

Carcinogenicity:

An increased incidence of tumors was observed in some laboratory animals but not in others.
Overall weight of evidence indicates that the substance is not carcinogenic.

Mutagenicity:

Did not cause genetic damage in animals.
Did not cause genetic damage in cultured mammalian cells.
Experiments showed mutagenic effects in cultured bacterial cells.

Reproductive toxicity:

Evidence suggests the substance is not a reproductive toxin in animals.

Teratogenicity:
Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.

Further information:
Cardiac sensitization threshold limit : 175000 mg/m3

1-Chloro-1, 2, 2, 2-tetrafluoroethane (HCFC-124)

Dermal:
not applicable

Oral:
not applicable

Inhalation 4 h LC50:
> 230000 ppm , rat
Anesthetic effects
Central nervous system effects

Inhalation:
dog
Cardiac sensitization

Skin irritation:
No skin irritation, Not tested on animals
Not expected to cause skin irritation based on expert review of the properties of the substance.

Eye irritation:
No eye irritation, Not tested on animals
Not expected to cause eye irritation based on expert review of the properties of the substance.

Skin sensitization:
Does not cause skin sensitization. Not tested on animals
Not expected to cause sensitization based on expert review of the properties of the substance.

Repeated dose toxicity:
Inhalation
Multiple species
No toxicologically significant effects were found.

Carcinogenicity:
Animal testing did not show any carcinogenic effects.

Mutagenicity:
Did not cause genetic damage in animals.
Did not cause genetic damage in cultured mammalian cells.
Did not cause genetic damage in cultured bacterial cells.

Teratogenicity:
Animal testing showed no developmental toxicity.

Further information:
Cardiac sensitization threshold limit : 140000 mg/m3

1, 1-Difluoroethane (HFC-152a)

Inhalation 4 h LC50:
> 437500 ppm , rat

Inhalation:
dog
Cardiac sensitization

Skin irritation:
No skin irritation, Not tested on animals
Not expected to cause skin irritation based on expert review of the properties of the substance.

Eye irritation:
No eye irritation, Not tested on animals
Not expected to cause eye irritation based on expert review of the properties of the substance.

Skin sensitization:
Does not cause skin sensitization. Not tested on animals
Not expected to cause sensitization based on expert review of the properties of the substance.

Repeated dose toxicity:
Inhalation
Rat
No toxicologically significant effects were found.

Carcinogenicity:
Animal testing did not show any carcinogenic effects.

Mutagenicity:
Did not cause genetic damage in animals.
Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others.
Did not cause genetic damage in cultured bacterial cells.

Teratogenicity:
Evidence suggests the substance is not a developmental toxin in animals.

Further information:
Cardiac sensitization threshold limit : 405215 mg/m3

ECOLOGICAL INFORMATION

Aquatic Toxicity

Chlorodifluoromethane (HCFC-22)

96 h LC50	: Zebra fish 777 mg/l
96 h EC50	: Algae 250 mg/l
48 h EC50	: Daphnia magna (Water flea) 433 mg/l

1, 1-Difluoroethane (HFC-152a)

96 h LC50	: Fish (unspecified species) 295.783 mg/l
96 h EC50	: Algae 47.755 mg/l (calculated)
48 h EC50	: Daphnia 146.695 mg/l

Environmental Fate

Chlorodifluoromethane (HCFC-22)

Biodegradability : According to the results of tests of biodegradability this product is not readily biodegradable.

DISPOSAL CONSIDERATIONS

Waste Disposal:

Can be used after re-conditioning. Recover by distillation or remove to a permitted waste disposal facility. Comply with applicable Federal, State/Provincial and Local Regulations.

Environmental Hazards:

Empty pressure vessels should be returned to the supplier.

TRANSPORTATION INFORMATION

TDG_ROAD	UN number	: 3163
	Proper shipping name	: Liquefied gas, n.o.s. (Chlorodifluoromethane, 2-Chloro- 1, 1, 1, 2-Tetrafluoroethane)
	Class	: 2.2
	Labeling No.	: 2.2
TDG_RAIL	UN number	: 3163
	Proper shipping name	: Liquefied gas, n.o.s. (Chlorodifluoromethane, 2-Chloro- 1, 1, 1, 2-Tetrafluoroethane)
	Class	: 2.2
	Labeling No.	: 2.2
IATA_C	UN number	: 3163
	Proper shipping name	: Liquefied gas, n.o.s. (Chlorodifluoromethane, 2-Chloro- 1, 1, 1, 2-Tetrafluoroethane)
	Class	: 2.2
	Labeling No.	: 2.2
IMDG	UN number	: 3163
	Proper shipping name	: Liquefied gas, n.o.s. (Chlorodifluoromethane, 2-Chloro- 1, 1, 1, 2-Tetrafluoroethane)
	Class	: 2.2
	Labeling No.	: 2.2

REGULATORY INFORMATION

DSL Status:

On the inventory, or in compliance with the inventory

WHMIS Classification:

A - Compressed Gas

Remarks:

One or more components of this product are subject to a Significant New Activity (SNAc) restriction under the Canadian Environmental Protection Act (CEPA).

End of MSDS