A-GAS™

Speciality Chemicals and Gases

R406A

Material Safety Data Sheet

Prepared by: A-Gas (SA) Pty Ltd

Date prepared : 01/10/07

References: AGAS406A-011007

This material is not classified as Hazardous according to criteria of NOHSC

1. COMPANY IDENTIFICATION

Data concerning Distributors:

A-Gas South Africa (Pty) Ltd
8 Railway Road
Montague Gardens
Cape Town
7442
South Africa
Phone: 27 21 551 8790
Fax: 27 21 551 8798
E-Mail: info.sa@agas.com

Emergency telephone number:

0800005817

2. IDENTIFICATION

Product name:	R406A
Chemical name:	R22-**55%**, R142b-**41%**, R600a-**4%**
Synonym(s):	N/A
UN:	1078
DG Class:	2.2
Hazchem Code:	2RE
Schedule:	Not Scheduled
CAS Number:	R22 - 75-45-6 R142b – 75-68-3 R600a – 75-28-5

3. HAZARDS IDENTIFICATION

- Presents an insignificant hazard to human health.
- In case of decomposition, releases dangerous products

4. FIRST-AID MEASURES

Effects

Inhalation
- At high concentrations, risk of narcosis.
- At high concentrations, risk of cardiac arrhythmia.
- At high concentrations, risk of asphyxia by lack of oxygen.

Eye Contact
(Gas)
- None

(Liquefied gas)
- Severe eye irritation, watering, redness and swelling of the eyelids.
- Risk of burns (frostbite)

Skin Contact
(Gas)
- None

(Liquefied gas)
- Cold sensation followed by redness of the skin.
- Risk of frostbite

Ingestion
(Gas)
- Impossible risk.

First Aid

Inhalation
- Remove the subject from the contaminated area.
- Oxygen or cardiopulmonary resuscitation or oxygen if necessary
- Consult with a physician in case of respiratory and nervous symptoms.

Eye Contact
- Keep eyelids open to allow evaporation of product.
- Flush eyes with running water for several minutes, while keeping the eyelids wide open.
- Consult with an ophthalmologist in case of persistent pain.

Skin Contact
- Allow product to evaporate
- Rinse with lukewarm running water
- Consult with a physician in case of persistent pain or redness.

Ingestion
- General recommendations
- Risk not possible (gas)

Medical Treatment

General recommendations:
- **DO NOT** give adrenergetic drugs.

Inhalation
- None

Eye Contact
♦ On the advice of the ophthalmologist

Skin Contact
♦ Usual treatment of burns

Ingestion
♦ None

5. FIRE-FIGHTING MEASURES

Common extinguishing methods
♦ In case of fire in close proximity, all means of extinguishing are acceptable.

Inappropriate extinguishing methods
♦ No restriction.

Specific hazards
♦ Non-flammable (see Section 9)
♦ Formation of dangerous gas/vapours in case of decomposition (see Section 10)
♦ Gas/vapours combustion possible in presence of air in very particular conditions (see Section 9)

Protective measures in case of intervention
♦ Evacuate all non-essential personnel
♦ In all cases wear self-contained breathing apparatus when in close proximity or intervention wear acid resistant suit
♦ After intervention proceed to clean the equipment (take a shower, remove clothing carefully, clean and check).
♦ Intervention only by capable personnel who are trained and aware of the hazards of the product.

Other precautions
♦ If safe to do so, remove the exposed containers, or cool with large quantities of water.
♦ After the fire, ventilate and clean the rooms before re-entry.

6. ACCIDENTAL RELEASE MEASURES

Precautions
♦ Respect the protection measures given in Section 5.
♦ Local ventilation.
♦ If safe to do so, without exposing the personnel, try to stop the spillage.
♦ Avoid materials and products which are incompatible with the product (see Section 10).

Clean up methods
♦ Let the product evaporate.
♦ Prevent the product from entering sewers or confined places.

Precautions for protection of the environment
♦ Avoid discharges into the environment (atmosphere, etc.)

7. HANDLING AND STORAGE

Handling
♦ Operate in a well-ventilated area.

♦ Prevent any product decomposition vapours from contacting hot spots.
♦ Prevent any product decomposition vapours from electric arc action (post welding).
♦ Use only containers which are compatible with the substance.
♦ Keep away from sources of ignition and heat.
♦ Keep away from reactive substances.

Storage
♦ In a ventilated, cool area.
♦ Keep away from heat sources.
♦ Keep away from reactive substances
.
Other precautions
♦ Warn personnel of the dangers of the product

Packaging
♦ Steel

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls
♦ Local ventilation.
♦ Respect the measures given in Section 7.
♦ Install apparatus with respect to the limit values.

Authorised limit values
♦ SAEL 1994-1995
TWA = 1000 ppm
Chlorodifluoromethane
TLV (ACGIH-USA) 1994-1995
TWA = 1000 ppm
TWA = 3540 mg/m^3

Respiratory protection
♦ None if the local exhaust ventilation is adequate.
♦ Self-contained breathing apparatus if risk of decomposition.
♦ Self-contained breathing apparatus in medium confinement/insufficient oxygen/in case of large uncontrolled emissions / in all circumstances when the mask and cartridge do not give adequate protection.
♦ Use only respiratory protection that confirms to inter/national standards.

Hand protection
♦ Protective gloves - chemical resistant:
♦ Recommended materials: Polyvinylalcohol

Eye protection
♦ Wear protective goggles for all industrial operations.
♦ Chemical proof goggles/face shield, if risk of splashing.

Skin protection
♦ Apron/boots of neoprene if risk of splashing.

Other precautions
♦ Shower and eye wash stations.
♦ Gloves, overalls and boots have to be double layered (protection against cold temperature).
♦ Consult your Occupational Health and Safety Officer for the selection of personal protective equipment suitable for the working conditions.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Pressurised liquefied gas
Colour: Colourless
Odour: Odourless

Change of state
Freezing point:
♦ No data
Boiling point/range (1013mbars):
♦ Between -32 to -23°C

Flash point
♦ No data
♦ Remark
♦ Non-flammable mixture

Flammability
♦ No flammability limit in air.
Remark:
Non flammable mixture, but in case of leak of liquefied gas, the liquid phase can ignite if the concentration > 60% in weight of R142b.

Auto-flammability
♦ **-** 632 to 635° C.

Vapour Pressure
♦ = 5.62 bar
temperature 20° C.
= 12.45 bar
temperature 50° C.
Density
♦ Specific gravity (D25/4) = 1.13

Vapour Density (air = 1)
♦ > 3
temperature 20° C.

Solubility
♦ Water = 4.9 g/l.
♦ Soluble in most organic solvents.

pH
♦ Neutra

Partition coefficient P (n-octanol/water)
♦ = 1.08
♦ Test Substance:
♦ Data relative to R22

Decomposition temperature
♦ = 96° C.
♦ Test Substance:
♦ Data relative to R22

Danger of explosion

Remark:
See also Section 10.

Oxidising properties
♦ Not applicable

Other data
♦ Critical temperature = 114° C.
♦ Critical pressure = 45.8 bar.

10. STABILITY AND REACTIVITY

Stability
♦ Stable under certain conditions (see below).
♦ Decomposition produces dangerous gases, upon contact with flames or hot metallic surfaces.

Conditions to avoid
♦ Heat / sources of heat.

Materials to avoid
♦ Metallic powders.
♦ Alkaline-earth metals.
♦ Alkaline metals and their alloys.

Hazardous decomposition products
♦ Hydrogen fluoride.
♦ Hydrochloric acid.
♦ Phosgene.
♦ Fluorophosgene.

Other Information
♦ Contact with strong bases or alkaline materials may provoke violent reactions or explosions.
♦ The vapour is heavier than air, disperses at ground level.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity
♦ Oral route, LD50, not applicable.
♦ Dermal route, LD50, not applicable.
♦ Inhalation, LC50, 4 hour(s), rat, >= 21.9% v/v air.
Test Substance:
♦ Data relative to R22 / R142b.

Irritation
♦ Rabbit, slightly irritant (skin).
Test Substance:
♦ Data relative to R22.
♦ Rabbit, slightly irritant (eyes).
Test Substance:
♦ Data relative to R22.

Sensitisation
♦ Guinea Pig, non sensitising (skin).
Test Substance:
♦ Data relative to R22.

Chronic toxicity

♦ Inhalation, after single exposure, dog, cardiac sensitisation following adrenergic stimulation.
Test Substance:
♦ Data relative to R22 / R142b.
♦ Inhalation, after prolonged exposure, rat, no toxic effect.
Test Substance:
♦ Data relative to R142b.
♦ Inhalation, after prolonged exposure, rat, target organ: salivary glands, 5% v/v air, carcinogenic effect.
Test Substance:
♦ Data relative to R22.
♦ Inhalation, after prolonged exposure, mouse, no carcinogenic effect.
Test Substance:
♦ Data relative to R22
♦ No carcinogenic, teratogenic effects.
Test Substance:
♦ Data relative to R142b.
♦ Inhalation, rat, Target organ: eyes, 5% v/v air, teratogenic effect
Test Substance:
♦ Data relative to R22.
♦ In vitro, ambiguous mutagenic effect.
Test Substance:
♦ Data relative to R142b.
♦ In vivo, no mutagenic effect.
Test Substance:
♦ Data relative to R142b.
♦ No mutagenic effect.
Test Substance:
♦ Data relative to R22
♦ Data relative to R22 / R142b.

Comments

♦ Not hazardous in normal conditions of handling and use

12. ECOLOGICAL INFORMATION

Acute Ecotoxicity

♦ Fishes, poecilia reticulata, LC50, 96 hour(s), 220 mg/1
Test substance:
♦ Data relative to R142b
♦ Crustaceans, daphnia magna, EC 50 48 hour(s), 160 mg/1
Test substance:
♦ Data relative to R142b

Chronic ecotoxicity

♦ Result: no data

Mobility

♦ Air, Henry's law constant (H) between 15 to 26 kPa.m^3/mol
Result: considerable volatility.
♦ Conditions: 20° C / calculated value.
Test Substance:
♦ Data relative to the mixture R22 / R142b
♦ Water, evaporation, t (100%) = 3 day (s)

♦ Conditions: 20° C/saturated solution
Test Substance:
♦ Data relative to R22
♦ Water, evaporation, t 1/2 = 3 hour(s)
♦ Conditions: calculated value from mathematical model/river
Test Substance:
♦ Data relative to R142b.
♦ Soil / sediments, absorption, log KOC between 1.25 to 2
♦ Conditions: calculated value.
Test Substance:
♦ Data relative to R22/R42b.

Abiotic degradation
♦ Air, indirect photo-oxidation, t 1/2 between 10 to 15 year(s).
♦ Conditions: sensitiser, OH radical.
♦ Degradation's products: carbon dioxide/hydrochloric acid/hydrogen fluoride.
Test Substance:
♦ Data relative to the mixture R22/R142b
♦ Air, photolysis, ODP between 0.055 to 0.065.
Result: limited effect on stratospheric ozone.
♦ Reference value for CFC 11: ODP = 1.
Test Substance:
♦ Data relative to the mixture R22/R142b.
♦ Air, greenhouse effect, GWP between 0.36 and 0.42.
♦ Reference value for CFC 11: GWP = 1
Test Substance:
♦ Data relative to the mixture R22/R142b.
♦ Water / soil, hydrolysis, t 1/2 between 25 to 40 year (s).
Result: non-significant hydrolysis.
♦ Conditions: pH 8/25° C.
Test Substance:
♦ Data relative to R22
♦ Water / soil, hydrolysis, t 1/2 > 10000 year(s).
Result: non-significant hydrolysis.
♦ Conditions: calculated value
Test Substance:
♦ Data relative to R142b.

Biotic degradation
♦ Aerobic, test: ready biodegradability/closed bottle, degradation = 0% 28 day (s).
Result: non-readily biodegradable.
Test Substance:
♦ Data relative to R22
♦ Aerobic, test: ready biodegradability/modified STURM, degradation = 5% 28 day(s).
Result: non-readily biodegradable.
Test Substance:
♦ Data relative to R142b

Potential for bioaccumulation
♦ Bioconcentration: log Po/w - 1.08.
Result: non-bioaccumulable.
Test Substance:
♦ Data relative to R22
♦ Bioconcentration: Aquatic organisms, BCF = 42
Result: non-bioaccumulable.
♦ Conditions: calculated value.
Test Substance:

♦ Data relative to R142b

Comments

♦ Product is persistent in air (atmospheric lifetime: 14 years).
♦ Product is not significantly hazardous for the aquatic environment as: considerable volatility no bioaccumulation

13. DISPOSAL CONSIDERATIONS

Waste treatment

♦ Comply with local and national regulations.
♦ Contact A-Gas Australia for information regarding recycling.

Packaging treatment

♦ To avoid treatments, as far as possible, use dedicated containers.

14. TRANSPORT INFORMATION

UN Number	**1078**
Dangerous Goods	
Class & Subsidiary Risk:	2.2 NON FLAMMABLE GAS
Hazchem Code:	2RE
Poisons Schedule:	None allocated
Transport EPG Card:	2C2 Emergency Guide

15. REGULATORY INFORMATION

♦ Non Hazardous Refrigerant Gas

16. OTHER INFORMATION

The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product which confirms to the specification, unless otherwise stated. In the case of combinations and mixtures one must make sure that new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene and protection of human welfare and the environment.