

SOLKANE® 22

Material Safety Data Sheet

Date prepared 28.05.1998

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Supplier

A-Gas (UK) Limited
Banyard Road
Portbury West
Bristol
BS20 7XH

Emergency telephone number

[+44] (0) 127 537 6600

Identification of the substance or the preparation**Product name**

- SOLKANE® 22

Chemical name

- Chlorodifluoromethane

Synonym(s)

- HCFC-22

- HFA-22

- R22

Formula: CHClF₂

Molecular Weight: 86.5

EC Number (EINECS) : 200-871-9

2. COMPOSITION/INFORMATION ON INGREDIENTS

- Chlorodifluoromethane

Concentration : = 99.5 %

CAS Number : 75-45-6

EC Number (EINECS) : 200-871-9

Phrases R : 59

3. HAZARDS IDENTIFICATION

- Gas (liquefied).
- Presents little 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.

Eyes contact

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

Skin contact

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

Ingestion

- Impossible risk (gas).

First aid

Inhalation

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

Eyes 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).
- If the subject is completely conscious:
- Negligible
- If the subject is unconscious:
- Not applicable

Medical treatment

General information

- Do not give adrenergic drugs.

Inhalation

- Negligible

Eyes contact

- On the advice of the ophthalmologist.

Skin contact

- Usual treatment for burns.

Ingestion

- Negligible

5. FIRE-FIGHTING MEASURES

Common extinguishing means

- In case of fire in close proximity, all means of extinguishing are acceptable (subject to section below).

Inappropriate extinguishing means

- 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 and/or consult the producer).

Protective measures in case of intervention

- Evacuate all non-essential personnel.
- Wear self contained breathing apparatus when in close proximity or in confined spaces.
- When interventions in close proximity wear full protective 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.
- Stay at safe distance in a protected location sheltered from possible projectiles.
- Never approach containers which have been exposed to fire, without cooling them sufficiently.
- As for any fire, ventilate and clean the rooms before re-entry.

6. ACCIDENTAL RELEASE MEASURES

Precautions

- Follow the protective measures given in section 8.
- Ventilate the premises.
- If safe to do so, without over exposing anyone, try to stop the leak.
- Keep away materials and products which are incompatible with the product (see section 10).
- In case of leaking container, try to reposition it to get the in leak gaseous phase.
- Gas/vapours heavier than air may accumulate in confined spaces, causing possible oxygen depletion.

Cleanup methods

- Let the product evaporate.
- Prevent the product from entering sewers or confined places.

Precautions for protection of the environment

- Prevent discharges into the environment (atmosphere,...).

7. HANDLING AND STORAGE

Handling

- Carry out all operations in closed piping circuits and equipment.
- Operate in a well-ventilated area.
- Prevent product vapours decomposition from contacting hot spots.
- Use only equipment and materials which are compatible with the product.
- Keep away from reactive products (see section 10).

Storage

- Keep in a hermetically sealed container.
- In a ventilated, cool area.
- Keep away from heat sources.
- Keep away from reactive products (see section 10).

Other precautions

- Follow the protective measures given in section 8.

Packaging

- Steel

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls

- Provide local ventilation suitable for the emission risk.
- Maintain employee exposures to levels below the applicable exposure limits.
- Follow the protective measures given in section 7.

Authorised limit values

- Chlorodifluoromethane
TLV (ACGIH-USA) 1998-99
TWA = 1000 ppm
TWA = 3540 mg/m³

Respiratory protection

- Minimum need if the local exhaust ventilation is adequate.
- In case of decomposition, self-contained breathing apparatus.
- Self-contained breathing apparatus in medium onfinement/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 conforms to international/national standards.

Hand protection

- Protective gloves - chemical resistant:
- Recommended materials: Polyvinylalcohol

Eye protection

- Wear protective goggles for all industrial operations.
- If risk of splashing, chemical proof goggles/face shield.

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 the industrial hygienist or the safety manager for the selection of personal protective equipment suitable for the working conditions.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: pressurised liquefied gas.

Color/Colour: colorless/colourless

Odor/Odour: slightly ethereal.

Change of state

- Freezing point:
= -160 °C
- Boiling point/range (1013 mbars):
= -40.8 °C

Flash point

- Negligible

Flammability

- No flammability limit in air

Remark:

Non flammable gas.

Auto-flammability

- 635 °C

Vapour/vapour pressure

- = 9.12 bar
temperature 20 °C
- = 19.56 bar
temperature 50 °C

Density

- Specific gravity (D 20/4)
= 1.22

Vapour/vapour density (air=1)

- = 3.65
temperature 20 °C

Solubility

- Slightly soluble in:
 - Water
= 0.3 % weight
temperature 25 °C

Remark:

Pressure = 1 bar

- Soluble in
 - Most organic solvents

pH

- neutral

Partition coefficient P (n-octanol/water)

- log P o/w = 1.08

Viscosity

- Dynamic viscosity (liquid)
= 0.198 mPa.s
temperature 25 °C

Decomposition temperature

- No data

Danger of explosion

- Remark:
See also section 10

Oxidizing properties

- Non oxidizer

Other data

- Critical temperature:
= 96 °C
- Critical pressure:
= 49.8 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 vapor is heavier than air, disperses at ground level.

11.TOXICOLOGICAL INFORMATION

Acute toxicity

- Oral route, LD 50, not applicable.
- Dermal route, LD 50, not applicable.
- Inhalation, LC 50, 4 hour(s), rat, 21.9 %.

Irritation

- Rabbit, slightly irritant (skin).
- Rabbit, slightly irritant (eyes).

Sensitisation

- Guinea Pig, Non sensitising (skin).

Chronic toxicity

- Inhalation, after a single exposure, dog, = 5 % v/v air, cardiac sensitisation following adrenergic stimulation.
- Inhalation, after prolonged exposure, rat, Target organ: salivary glands, 5 % v/v air, carcinogenic effect.
- No mutagenic effect.
- Inhalation, rat, Target organ: eyes, 5 % v/v air, teratogenic effect. High dose.
- Inhalation, after prolonged exposure, mouse, no carcinogenic effect.
- Inhalation, after prolonged exposure, rat, no carcinogenic effect.

Comments

- Not hazardous in normal conditions of handling and use

12.ECOLOGICAL INFORMATION

Acute ecotoxicity

- Result: no data.

Chronic ecotoxicity

- Result: no data.

Mobility

- Air, Henry's law constant (H) ca. 26 kPa.m³/mol.
Result: considerable volatility.
Conditions: 20 °C/calculated value.
- Water, evaporation, t (100%) = 3 day(s).
Conditions: 20 °C/saturated solution.
- Soil/sediments, adsorption, log KOC from 1.25 to 1.76.
Conditions: calculated value.

Abiotic degradation

- Air, indirect photo-oxidation, t 1/2 = 9.6 year(s).
Conditions: sensitizer: OH radicals.
Degradation's products: carbon dioxide/hydrochloric acid/fluorhydric acid.
- Air, photolysis, ODP = 0.055.
Result: limited effect on stratospheric ozone.
Reference value for CFC 11: ODP = 1.
- Air, greenhouse effect, GWP = 0.36.
Reference value for CFC 11: GWP = 1.
- Water/soil, hydrolysis, t 1/2 from 25 to 40 year(s).
Result: non-significant hydrolysis.
Conditions: pH 8/25 °C.

Biotic degradation

- Aerobic, test : ready biodegradability/closed bottle, degradation= 0 %, 28 day(s).
- Result: non-readily biodegradable.

Potential for bioaccumulation

- Bioconcentration : log Po/w = 1.08.
- Result: non-bioaccumulable.

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**

- Dispose in compliance with local/federal and national regulations.
- It is recommended to contact the producer for recycling/recovery.

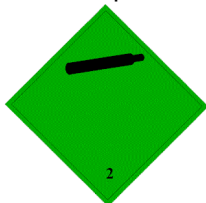
Packaging treatment

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

14.TRANSPORT INFORMATION

UN Number: 1018
IATA Class: 2.2
Hazard label: NON FLAMMABLE GAS
PSN
CHLORODIFLUOROMETHANE
IMDG Class: 2.2
Hazard label: COMPRESSED GAS NON FLAMMABLE
Placard: 1018
MFAG 350
EmS 2-09
IMDG Name:
CHLORODIFLUOROMETHANE
ADR/ADNR Class 2, 2° A
Hazard label: 2
Placard: 20/1018
ADR/RID Name:
CHLORODIFLUOROMETHANE
RID Class 2, 2° A
Hazard label: 2 + 13
Placard: 20/1018
ADR/RID Name:
CHLORODIFLUOROMETHANE

ADR type labels. Adaptation may be required for some packages or other means of transport



15.REGULATORY INFORMATION

EEC Labelling

- Hazardous substance name
 - Chlorodifluoromethane
 - Not dangerous according to Dir. 92/32/EEC.
 - Labelling following Dir. 93/21/EEC - Section 5.2.2.2
- Phrases R :
- 59 Dangerous for the ozone layer.

16.OTHER INFORMATION

Reason for update

- Update: denominations

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 conforms to the specification, unless other wise stated. In the case of combinations and mixtures one must make sure that no 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.