

**A-GAS R22**Hazard Alert Code:  
**MODERATE**

Chemwatch Material Safety Data Sheet

Revision No: 2.0

Chemwatch 15-7563

Issue Date: 10-Jul-2008

CD 2008/3

**Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION****PRODUCT NAME**

A-GAS R22

**PROPER SHIPPING NAME**

CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)

**PRODUCT USE**

» The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation. Refrigerant.

**SUPPLIER**

Company: A-Gas (Singapore) PTE LTD

Address:

360 Orchard Road, #10-05






International Building 238869

Telephone: 65 6836 0065

Emergency Tel: 65 6836 0065

Fax: 65 6836 6521

**HAZARD RATINGS**

	Min	Max	
Flammability:	0		
Toxicity:	2		
Body Contact:	2		
Reactivity:	1		
Chronic:	2		

Min/Nil=0  
Low=1  
Moderate=2  
High=3  
Extreme=4

**Section 2 - HAZARDS IDENTIFICATION****STATEMENT OF HAZARDOUS NATURE****DANGEROUS GOODS. NON-HAZARDOUS SUBSTANCE.** According to the Criteria of NOHSC, and the ADG Code.**POISONS SCHEDULE**

None

**RISK**

Risk Codes	Risk Phrases
R04	» Forms very sensitive explosive metallic compounds.
R44	» Risk of explosion if heated under confinement.

**SAFETY**

Safety Codes	Safety Phrases
S23	» Do not breathe gas/ fumes/ vapour/ spray.
S24	» Avoid contact with skin.
S39	» Wear eye/ face protection.
S51	» Use only in well ventilated areas.
S09	» Keep container in a well ventilated place.
S07	» Keep container tightly closed.
S26	» In case of contact with eyes rinse with plenty of water and contact Doctor or Poisons Information Centre.
S60	» This material and its container must be disposed of as hazardous waste.

**Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS**

NAME	CAS RN	%
chlorodifluoromethane	75-45-6	>99.5

**Section 4 - FIRST AID MEASURES**

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**SWALLOWED**

» Not considered a normal route of entry. For advice, contact a Poisons Information Centre or a doctor.

- Avoid giving milk or oils.
- Avoid giving alcohol.

**EYE**

»

- If product comes in contact with eyes remove the patient from gas source or contaminated area.
- Take the patient to the nearest eye wash, shower or other source of clean water.
- Open the eyelid(s) wide to allow the material to evaporate.
- Gently rinse the affected eye(s) with clean, cool water for at least 15 minutes. Have the patient lie or sit down and tilt the head back. Hold the eyelid(s) open and pour water slowly over the eyeball(s) at the inner corners, letting the water run out of the outer corners.
- The patient may be in great pain and wish to keep the eyes closed. It is important that the material is rinsed from the eyes to prevent further damage.
- Ensure that the patient looks up, and side to side as the eye is rinsed in order to better reach all parts of the eye(s)
- Transport to hospital or doctor.
- Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur.
- If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage.
- Ensure verbal communication and physical contact with the patient.

DO NOT allow the patient to rub the eyes DO NOT allow the patient to tightly shut the eyes DO NOT introduce oil or ointment into the eye(s) without medical advice  
DO NOT use hot or tepid water.

**SKIN**

» If skin contact occurs:

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

In case of cold burns (frost-bite):

- Move casualty into warmth before thawing the affected part; if feet are affected carry if possible
- Bathe the affected area immediately in luke-warm water (not more than 35 deg C) for 10 to 15 minutes, immersing if possible and without rubbing
- DO NOT apply hot water or radiant heat.
- Apply a clean, dry, light dressing of "fluffed-up" dry gauze bandage
- If a limb is involved, raise and support this to reduce swelling
- If an adult is involved and where intense pain occurs provide pain killers such as paracetamol
- Transport to hospital, or doctor
- Subsequent blackening of the exposed tissue indicates potential of necrosis, which may require amputation.

**INHALED**

»

- Following exposure to gas, remove the patient from the gas source or contaminated area.
- NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer.
- Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures.
- If the patient is not breathing spontaneously, administer rescue breathing.
- If the patient does not have a pulse, administer CPR.
- If medical oxygen and appropriately trained personnel are available, administer 100% oxygen.
- Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction.
- Keep the patient warm, comfortable and at rest while awaiting medical care.
- MONITOR THE BREATHING AND PULSE, CONTINUOUSLY.
- Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.

**NOTES TO PHYSICIAN**

» for intoxication due to Freons/ Halons;

A: Emergency and Supportive Measures

- Maintain an open airway and assist ventilation if necessary
- Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.

- Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:

- There is no specific antidote

C: Decontamination

- Inhalation; remove victim from exposure, and give supplemental oxygen if available.
- Ingestion; (a) Prehospital: Administer activated charcoal, if available. DO NOT induce vomiting because of rapid absorption and the risk of abrupt onset CNS depression. (b) Hospital: Administer activated charcoal, although the efficacy of charcoal is unknown. Perform gastric lavage only if the ingestion was very large and recent (less than 30 minutes)

D: Enhanced elimination:

- There is no documented efficacy for diuresis, haemodialysis, haemoperfusion, or repeat-dose charcoal.
- POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition
- Do not administer sympathomimetic drugs unless absolutely necessary as material may increase myocardial irritability.
  - No specific antidote.
  - Because rapid absorption may occur through lungs if aspirated and cause systematic effects, the decision of whether to induce vomiting or not should be made by an attending physician.
  - If lavage is performed, suggest endotracheal and/or esophageal control.
  - Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.
  - Treatment based on judgment of the physician in response to reactions of the patient
- DO NOT administer sympathomimetic drugs as they may cause ventricular arrhythmias.

for gas exposures:

**BASIC TREATMENT**

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for pulmonary oedema .
- Monitor and treat, where necessary, for shock.
- Anticipate seizures.

**ADVANCED TREATMENT**

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.

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- Monitor and treat, where necessary, for arrhythmias.
  - Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
  - Drug therapy should be considered for pulmonary oedema.
  - Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
  - Treat seizures with diazepam.
  - Proparacaine hydrochloride should be used to assist eye irrigation.
- BRONSTEIN, A.C. and CURRANCE, P.L.  
EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994.

**Section 5 - FIRE FIGHTING MEASURES****EXTINGUISHING MEDIA**

» SMALL FIRE: Use extinguishing agent suitable for type of surrounding fire.

LARGE FIRE: Cool cylinder.

DO NOT direct water at source of leak or venting safety devices as icing may occur.

**FIRE FIGHTING**

»

**GENERAL**

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus and protective gloves.
- Fight fire from a safe distance, with adequate cover.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- DO NOT approach cylinders suspected to be hot.
- Cool fire exposed cylinders with water spray from a protected location.
- If safe to do so, remove cylinders from path of fire.

**SPECIAL REQUIREMENTS:**

- Excessive pressures may develop in a gas cylinder exposed in a fire; this may result in explosion.
- Cylinders with pressure relief devices may release their contents as a result of fire and the released gas may constitute a further source of hazard for the fire-fighter.
- Cylinders without pressure-relief valves have no provision for controlled release and are therefore more likely to explode if exposed to fire.

**FIRE FIGHTING REQUIREMENTS:**

The need for proximity, entry and special protective clothing should be determined for each incident, by a competent fire-fighting safety professional.

**FIRE/EXPLOSION HAZARD**

»

- Containers may explode when heated - Ruptured cylinders may rocket
  - Fire exposed containers may vent contents through pressure relief devices.
  - High concentrations of gas may cause asphyxiation without warning.
  - May decompose explosively when heated or involved in fire.
  - Contact with gas may cause burns, severe injury and/ or frostbite.
- Decomposition may produce toxic fumes of: carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), hydrogen chloride, phosgene, hydrogen fluoride, other pyrolysis products typical of burning organic material.  
Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

**FIRE INCOMPATIBILITY**

»

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

**HAZCHEM**

None

**Personal Protective Equipment**

Gas tight chemical resistant suit.

**Section 6 - ACCIDENTAL RELEASE MEASURES****EMERGENCY PROCEDURES****MINOR SPILLS**

»

- Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used.
- DO NOT enter confined spaces were gas may have accumulated.
- Increase ventilation.
- Clear area of personnel.
- Stop leak only if safe to do so.
- Remove leaking cylinders to safe place. Release pressure under safe controlled conditions by opening valve.
- Orientate cylinder so that the leak is gas, not liquid, to minimise rate of leakage
- Keep area clear of personnel until gas has dispersed.

**MAJOR SPILLS**

»

- Clear area of all unprotected personnel and move upwind.
- Alert Emergency Authority and advise them of the location and nature of hazard.
- Wear breathing apparatus and protective gloves.
- Prevent by any means available, spillage from entering drains and water-courses.
- Consider evacuation.
- Increase ventilation.
- No smoking or naked lights within area.

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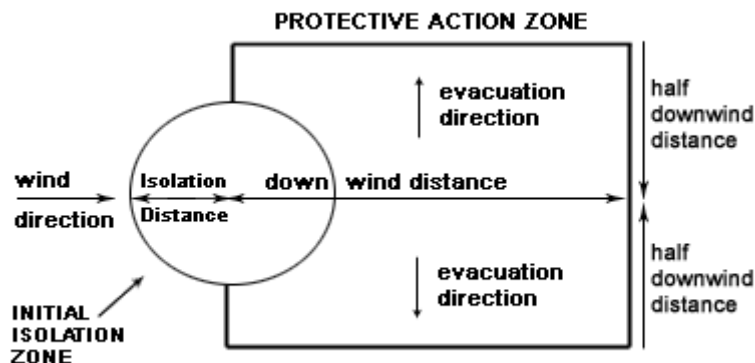
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- Stop leak only if safe to so do.
- Water spray or fog may be used to disperse vapour.
- DO NOT enter confined space where gas may have collected.
- Keep area clear until gas has dispersed.
- Remove leaking cylinders to a safe place.
- Fit vent pipes. Release pressure under safe, controlled conditions
- Burn issuing gas at vent pipes.
- DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve.

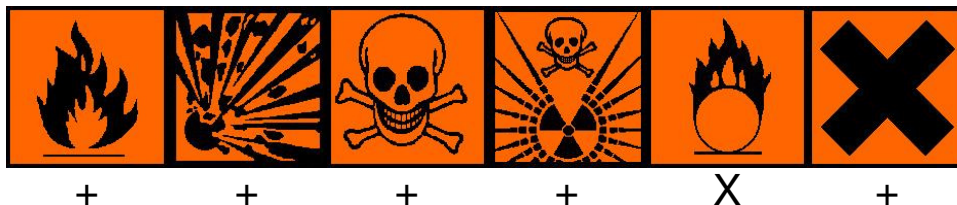
**PROTECTIVE ACTIONS FOR SPILL**

From IERG (Canada/Australia)

Isolation Distance	50 metres
Downwind Protection Distance	500 metres
IERG Number	6

**FOOTNOTES**

- 1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.
- 2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.
- 3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.
- 4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.
- 5 Guide 126 is taken from the US DOT emergency response guide book.
- 6 IERG information is derived from CANUTEC - Transport Canada.

**SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS**

X: Must not be stored together

O: May be stored together with specific preventions

+: May be stored together

**Personal Protective Equipment advice is contained in Section 8 of the MSDS.****Section 7 - HANDLING AND STORAGE****PROCEDURE FOR HANDLING**

- Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal.
- Use a pressure reducing regulator when connecting cylinder to lower pressure (<100 psig) piping or systems
- Use a check valve or trap in the discharge line to prevent hazardous back-flow into the cylinder
- Check regularly for spills or leaks. Keep valves tightly closed but do not apply extra leverage to hand wheels or cylinder keys.
- Valve protection caps must remain in place unless container is secured with valve outlet piped to use point.
- Do NOT drag, slide or roll cylinders - use a suitable hand truck for cylinder movement
- Test for leakage with brush and detergent - NEVER use a naked flame.
- Do NOT heat cylinder by any means to increase the discharge rate of product from cylinder.
- Leaking gland nuts may be tightened if necessary.
- If a cylinder valve will not close completely, remove the cylinder to a well ventilated location (e.g. outside) and, when empty, tag as FAULTY and return to supplier.
- Obtain a work permit before attempting any repairs. DO NOT attempt repair work on lines, vessels under pressure.
- Atmospheres must be tested and O.K. before work resumes after leakage.
- DO NOT transfer gas from one cylinder to another.

**SUITABLE CONTAINER**

Cylinder: Steel packaging

Ensure the use of equipment rated for cylinder pressure.

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Ensure the use of compatible materials of construction.  
Valve protection cap to be in place until cylinder is secured, connected.  
Cylinder must be properly secured either in use or in storage.  
Cylinder valve must be closed when not in use or when empty.  
Segregate full from empty cylinders.  
**WARNING:** Suckback into cylinder may result in rupture. Use back-flow preventive device in piping.

**STORAGE INCOMPATIBILITY**

» Avoid reaction with.

Haloalkanes:

- are highly reactive: some of the more lightly substituted lower members are highly flammable.
- may react with the lighter divalent metals to produce more reactive compounds analogous to Grignard reagents.
- may produce explosive compounds following prolonged contact with metallic or other azides
- may react on contact with potassium or its alloys - although apparently stable on contact with a wide range of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact; severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures.

BREITHERICK L.: Handbook of Reactive Chemical Hazards

- react with metal halides and active metals, eg. sodium (Na), potassium (K), lithium (Li), calcium (Ca), zinc (Zn), powdered aluminium (Al) and aluminium alloys, magnesium (Mg) and magnesium alloys.
- may react with brass and steel.
- may react explosively with strong oxidisers
- may degrade rubber, and plastics such as methacrylate polymers, polyethylene and polystyrene, paint and coatings
- Avoid magnesium, aluminium and their alloys, brass and steel.
- Avoid reaction with oxidising agents

**STORAGE REQUIREMENTS**

- »
- Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open.
- Such compounds should be sited and built in accordance with statutory requirements.
- The storage compound should be kept clear and access restricted to authorised personnel only.
- Cylinders stored in the open should be protected against rust and extremes of weather.
- Cylinders in storage should be properly secured to prevent toppling or rolling.
- Cylinder valves should be closed when not in use.
- Where cylinders are fitted with valve protection this should be in place and properly secured.
- Gas cylinders should be segregated according to the requirements of the Dangerous Goods Act.
- Preferably store full and empty cylinders separately.
- Check storage areas for hazardous concentrations of gases prior to entry.
- Full cylinders should be arranged so that the oldest stock is used first.
- Cylinders in storage should be checked periodically for general condition and leakage.
- Protect cylinders against physical damage. Move and store cylinders correctly as instructed for their manual handling.

NOTE: A 'G' size cylinder is usually too heavy for an inexperienced operator to raise or lower.

Storage temperature: &lt;45 deg.C

**Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION****EXPOSURE CONTROLS**

Source	Material	TWA ppm	TWA mg/m <sup>3</sup>	STEL ppm	STEL mg/m <sup>3</sup>	Peak ppm	Peak mg/m <sup>3</sup>	TWA F/CC
Australia Exposure Standards	chlorodifluoromethane (Chlorodifluoromethane)	1000	3540					
Australia Exposure Standards	chlorodifluoromethane (Fluorides (as F))		2.5					

**MATERIAL DATA**

» Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

**INGREDIENT DATA**

CHLORODIFLUOROMETHANE:

The recommended TLV-TWA should provide an ample margin of safety to prevent cardiac sensitisation and systemic injury.

**PERSONAL PROTECTION**

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**EYE**

- »
- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59]

**HANDS/FEET**

- »
- Neoprene gloves
- When handling sealed cylinders wear cloth or leather gloves.
- Insulated gloves

**OTHER**

- »
- Protective overalls, closely fitted at neck and wrist.
- Eye-wash unit.
- Ensure availability of lifeline in confined spaces.
- Staff should be trained in all aspects of rescue work.
- Rescue gear: Two sets of SCUBA breathing apparatus Rescue Harness, lines etc.
- »
- Positive pressure, full face, air-supplied breathing apparatus should be used for work in enclosed spaces if a leak is suspected or the primary containment is to be opened (e.g. for a cylinder change)
- Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.

**RESPIRATOR**

» Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half-face Respirator	Full-Face Respirator
1000	10	AX-AUS	-
1000	50	-	AX-AUS
5000	50	Airline *	-
5000	100	-	AX-2
10000	100	-	AX-3
	100+		Airline**

\* - Continuous Flow \*\* - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

**ENGINEERING CONTROLS**

- »
- Areas where cylinders are stored require good ventilation and, if enclosed, need discrete/controlled exhaust ventilation.
- Secondary containment and exhaust gas treatment may be required by certain jurisdictions.
- Local exhaust ventilation may be required in work areas.
- Consideration should be given to the use of diaphragm or bellows-sealed, soft-seat valves; backflow prevention devices and flow-monitoring or limiting devices.
- Automated alerting systems with automatic shutdown of gas-flow may be appropriate and may in fact be mandatory in certain jurisdictions.
- Respiratory protection in the form of air-supplied or self-contained breathing equipment must be worn if the oxygen concentration in the workplace air is less than 19%.
- Cartridge respirators do NOT give protection and may result in rapid suffocation.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant: gas discharge (active generation into zone of rapid air motion) Air Speed: 1-2.5 m/s (200-500 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2.5 m/s (200-500 f/min.) for extraction of gases discharged 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

**Section 9 - PHYSICAL AND CHEMICAL PROPERTIES****APPEARANCE**

Colourless pressurized liquefied gas with a slight ethereal odour; slightly soluble in water.

**PHYSICAL PROPERTIES**

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**Gas.**

Molecular Weight: Not Applicable

Melting Range (°C): -160 (freezing point)

Solubility in water (g/L): Partly Miscible

pH (1% solution): Not Available

Volatile Component (%vol): Not Available

Relative Vapour Density (air=1): 3.65 @ 20 deg.C

Lower Explosive Limit (%): Not Applicable

Autoignition Temp (°C): 635

State: Liquefied Gas

Boiling Range (°C): -40.8 deg.C

Specific Gravity (water=1): 1.22 @ 20 deg.C

pH (as supplied): Neutral

Vapour Pressure (kPa): 908 @ 20 deg.C

Evaporation Rate: Not Available

Flash Point (°C): Not Applicable

Upper Explosive Limit (%): Not Applicable

Decomposition Temp (°C): 480

Viscosity: 0.198 mPa.s cSt@ 25 deg. °C

**Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION****CONDITIONS CONTRIBUTING TO INSTABILITY**

»

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.
- Presence of elevated temperatures.

**Section 11 - TOXICOLOGICAL INFORMATION****POTENTIAL HEALTH EFFECTS****ACUTE HEALTH EFFECTS****SWALLOWED**

» Not normally a hazard due to physical form of product.

Considered an unlikely route of entry in commercial/industrial environments.

**EYE**

» There is some evidence to suggest that this material can cause eye irritation and damage in some persons.

Vapourising liquid causes rapid cooling and contact may cause cold burns, frostbite, even through normal gloves. Frozen skin tissues are painless and appear waxy and yellow. Signs and symptoms of frost-bite may include "pins and needles", paleness followed by numbness, a hardening and stiffening of the skin, a progression of colour changes in the affected area, (first white, then mottled and blue and eventually black; on recovery, red, hot, painful and blistered).

**SKIN**

» Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.

There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons.

Fluorocarbons remove natural oils from the skin, causing irritation, dryness and sensitivity.

Material on the skin evaporates rapidly and may cause tingling, chilling and even temporary numbness.

Vapourising liquid causes rapid cooling and contact may cause cold burns, frostbite, even through normal gloves. Frozen skin tissues are painless and appear waxy and yellow. Signs and symptoms of frost-bite may include "pins and needles", paleness followed by numbness, a hardening and stiffening of the skin, a progression of colour changes in the affected area, (first white, then mottled and blue and eventually black; on recovery, red, hot, painful and blistered).

Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

**INHALED**

» Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.

Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.

There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.

Inhalation of non-toxic gases may cause:

- CNS effects: headache, confusion, dizziness, stupor, seizures and coma;
- respiratory: shortness of breath and rapid breathing;
- cardiovascular: collapse and irregular heart beats;
- gastrointestinal: mucous membrane irritation, nausea and vomiting.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. Vapour is heavier than air and may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.

Exposure to fluorocarbons can produce non-specific flu-like symptoms such as chills, fever, weakness, muscle pain, headache, chest discomfort, sore throat and dry cough with rapid recovery. High concentrations can cause irregular heartbeats and a stepwise reduction in lung capacity. Heart rate may be reduced.

Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction. In severe acute exposures there is always a danger of death from respiratory failure or cardiac arrest due to a tendency to make the heart more susceptible to catecholamines (adrenalin).

**CHRONIC HEALTH EFFECTS**

» There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

Principal route of occupational exposure to the gas is by inhalation.

Fluorocarbons can cause an increased risk of cancer, spontaneous abortion and birth defects.

**TOXICITY AND IRRITATION**

» Not available. Refer to individual constituents.

**CHLORODIFLUOROMETHANE:**

» unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

**TOXICITY**

Inhalation (rat) LC50: 35 pph/15m

Oral (rat) TDLo: 2457 mg/kg/26W-1

» **The substance is classified by IARC as Group 3:****IRRITATION**

Nil Reported

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NOT classifiable as to its carcinogenicity to humans.  
Evidence of carcinogenicity may be inadequate or limited in animal testing.

**CARCINOGEN**

chlorodifluoromethane

International Agency for Research on Cancer (IARC) Carcinogens

Group 3

**Section 12 - ECOLOGICAL INFORMATION**

» DO NOT discharge into sewer or waterways.  
Refer to data for ingredients, which follows:  
CHLORODIFLUOROMETHANE:  
Koc: 57.5  
Half-life (hr) air: 97236-151548  
Half-life (hr) H<sub>2</sub>O surface water: 2.7  
Henry's atm m<sup>3</sup>/mol: 0.0294  
BCF: 3.9  
controlled ozone depleting gases: phase out by 1996 (C)  
Bioaccumulation: not sig  
processes Abiotic: RxnOH<sup>+</sup>,hydrol

**Section 13 - DISPOSAL CONSIDERATIONS**

- »
- Evaporate residue at an approved site.
  - Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.
  - Ensure damaged or non-returnable cylinders are gas-free before disposal.

**Section 14 - TRANSPORTATION INFORMATION**

Labels Required: NON-FLAMMABLE COMPRESSED GAS  
HAZCHEM: None (ADG6)

**UNDG:**

Dangerous Goods Class:	2.2	Subrisk:	None
UN Number:	1018	Packing Group:	None

Shipping Name: CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)

**Air Transport IATA:**

ICAO/IATA Class:	2.2	ICAO/IATA Subrisk:	None
UN/ID Number:	1018	Packing Group:	None

Special provisions: None

Shipping Name: CHLORODIFLUOROMETHANE

**Maritime Transport IMDG:**

IMDG Class:	2.2	IMDG Subrisk:	None
UN Number:	1018	Packing Group:	None
EMS Number:	F-C,S-V	Special provisions:	None

Limited Quantities: 120 ml

Shipping Name: CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)

**Section 15 - REGULATORY INFORMATION****POISONS SCHEDULE**

None

**REGULATIONS**

A- Gas R22 (CAS: None):

No regulations applicable

chlorodifluoromethane (CAS: 75-45-6) is found on the following regulatory lists:

Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - disinfection by-products)

Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (Aquatic habitat)

Australia - Australian Capital Territory Environment Protection Regulation Ecosystem maintenance - Organic chemicals - Non-pesticide anthropogenic organics



**A-GAS R22****Hazard Alert Code:  
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Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Domestic water quality  
Australia - New South Wales Ozone Protection Regulation - Schedule 1 Controlled substances [NLV]  
Australia Exposure Standards  
Australia Hazardous Substances  
Australia High Volume Industrial Chemical List (HVICL)  
Australia Inventory of Chemical Substances (AICS)  
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 2  
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 5  
International Agency for Research on Cancer (IARC) Carcinogens  
International Council of Chemical Associations (ICCA) - High Production Volume List  
OECD Representative List of High Production Volume (HPV) Chemicals  
UNEP Montreal Protocol Ozone Depletors - Annex C  
WHO Guidelines for Drinking- water Quality - Guideline values for chemicals that are of health significance in drinking-water

**Section 16 - OTHER INFORMATION**

» Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:  
[www.chemwatch.net/references](http://www.chemwatch.net/references).

» The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Issue Date: 10-Jul-2008

Print Date:4-Dec-2008