A-Gas Full Refrigerant Analysis

A-Gas (Australia) Pty Ltd

Chemwatch Hazard Alert Code: **1**

Chemwatch: **24-4145**
Version No: **8.1**
Safety Data Sheet according to Work Health and Safety Regulations (Hazardous Chemicals) 2023 and ADG requirements

Issue Date: **23/12/2022**
Print Date: **02/07/2024**
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SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	A-Gas Full Refrigerant Analysis
Synonyms	Mixtures of Chlorofluorocarbons; Hydrochlorofluorocarbons; Hydrofluorocarbons; Reclaim refrigerant; Pumpdown refrigerant
Proper shipping name	REFRIGERANT GAS, N.O.S. (contains pentafluoroethane, trichlorofluoromethane, chlorodifluoromethane, 1,1-difluoroethane, dichlorodifluoromethane, iso-butane, propane, 1,1,1-trifluoroethane, octafluoropropane, 1-chloro-1,1-difluoroethane, difluoromethane, 1,1,1,2-tetrafluoroethane and 1-chloro-1,1,2,2-tetrafluoroethane)
Chemical formula	Not Applicable
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Refrigerant Industrial use only.

Details of the manufacturer or supplier of the safety data sheet

Registered company name	**A-Gas (Australia) Pty Ltd**
Address	9-11 Oxford Rd, Laverton North Victoria 3026 Australia
Telephone	93689222
Fax	Not Available
Website	www.agas.com
Email	Not Available

Emergency telephone number

Association / Organisation	**A-Gas (Australia) Pty Ltd**	**CHEMWATCH EMERGENCY RESPONSE (24/7)**
Emergency telephone numbers	**1800737001**	**+61 1800 951 288**
Other emergency telephone numbers	**Not Available**	**+61 3 9573 3188**

Once connected and if the message is not in your preferred language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification [1]	Gases Under Pressure (Liquefied Gas), Serious Eye Damage/Eye Irritation Category 2B, Hazardous to the Ozone Layer Category 1
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*

Label elements

Hazard pictogram(s)	
Signal word	**Warning**

Page 1 continued...

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
H320	Causes eye irritation.
H420	Harms public health and the environment by destroying ozone in the upper atmosphere.
AUH044	Risk of explosion if heated under confinement.

Precautionary statement(s) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read carefully and follow all instructions.

Precautionary statement(s) Prevention

P264	Wash all exposed external body areas thoroughly after handling.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.

Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.

Precautionary statement(s) Disposal

P502	Refer to manufacturer or supplier for information on recovery or recycling.

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
75-45-6	NotSpec	chlorodifluoromethane
811-97-2	NotSpec	1,1,1,2-tetrafluoroethane
354-33-6	NotSpec	pentafluoroethane
75-10-5	NotSpec	difluoromethane
420-46-2	NotSpec	1,1,1-trifluoroethane
75-37-6	NotSpec	1,1-difluoroethane
75-71-8	NotSpec	dichlorodifluoromethane
75-69-4	NotSpec	trichlorofluoromethane
74-98-6	NotSpec	propane
354-25-6	NotSpec	1-chloro-1,1,2,2-tetrafluoroethane
75-28-5.	NotSpec	iso-butane
75-68-3	NotSpec	1-chloro-1,1-difluoroethane
76-19-7	NotSpec	octafluoropropane

Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available*

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	▸ 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.

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	▸ 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 Contact	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 paracetomol ▸ Transport to hospital, or doctor ▸ Subsequent blackening of the exposed tissue indicates potential of necrosis, which may require amputation.
Inhalation	▸ 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.
Ingestion	▸ Not considered a normal route of entry.

Indication of any immediate medical attention and special treatment needed

For frost-bite caused by liquefied petroleum gas:

- If part has not thawed, place in warm water bath (41-46 C) for 15-20 minutes, until the skin turns pink or red.
- Analgesia may be necessary while thawing.
- If there has been a massive exposure, the general body temperature must be depressed, and the patient must be immediately rewarmed by whole-body immersion, in a bath at the above temperature.
- Shock may occur during rewarming.
- Administer tetanus toxoid booster after hospitalization.
- Prophylactic antibiotics may be useful.
- The patient may require anticoagulants and oxygen.

[Shell Australia 22/12/87]

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.
- 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.

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SECTION 5 Firefighting 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.

Special hazards arising from the substrate or mixture

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

Advice for firefighters

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.
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) Combustion products include: carbon dioxide (CO_2) hydrogen chloride phosgene hydrogen fluoride other pyrolysis products typical of burning organic material.
HAZCHEM	2TE

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	Environmental hazard - contain spillage. ▸ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used. ▸ **DO NOT** enter confined spaces where gas may have accumulated. ▸ Increase ventilation.
Major Spills	Environmental hazard - contain spillage. ▸ 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. ▸ 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 NOTattempt to operate damaged valve.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	· Consider use in closed pressurised systems, fitted with temperature, pressure and safety relief valves which are vented for safe dispersal. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature · The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines.

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	· Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended. · Before connecting gas cylinders, ensure manifold is mechanically secure and does not containing another gas. ▸ **DO NOT** transfer gas from one cylinder to another.
Other information	▸ 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.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Cylinder: ▸ Ensure the use of equipment rated for cylinder pressure. ▸ 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.
Storage incompatibility	▸ Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances ▸ Avoid reaction with oxidising agents

+	x	+	o	+	+	+

X — *Must not be stored together*
0 — *May be stored together with specific preventions*
+ — *May be stored together*

Note: Depending on other risk factors, compatibility assessment based on the table above may not be relevant to storage situations, particularly where large volumes of dangerous goods are stored and handled. Reference should be made to the Safety Data Sheets for each substance or article and risks assessed accordingly.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	chlorodifluoromethane	Chlorodifluoromethane	1000 ppm / 3540 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	1,1,1,2-tetrafluoroethane	1,1,1,2-Tetrafluoroethane	1000 ppm / 4240 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	dichlorodifluoromethane	Dichlorodifluoromethane	1000 ppm / 4950 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	trichlorofluoromethane	Trichlorofluoromethane	Not Available	Not Available	1000 ppm / 5620 mg/m3	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
chlorodifluoromethane	1,250 ppm	2,400 ppm	14,000 ppm
1,1,1,2-tetrafluoroethane	Not Available	Not Available	Not Available
difluoromethane	3,000 ppm	6,500 ppm	39,000 ppm
1,1-difluoroethane	Not Available	Not Available	Not Available
dichlorodifluoromethane	3,000 ppm	10,000 ppm	50,000 ppm
trichlorofluoromethane	91 ppm	1,000 ppm	10,000 ppm
propane	Not Available	Not Available	Not Available
iso-butane	5500* ppm	17000** ppm	53000*** ppm
1-chloro-1,1-difluoroethane	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
chlorodifluoromethane	Not Available	Not Available
1,1,1,2-tetrafluoroethane	Not Available	Not Available
pentafluoroethane	Not Available	Not Available
difluoromethane	Not Available	Not Available
1,1,1-trifluoroethane	Not Available	Not Available

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Ingredient	Original IDLH	Revised IDLH
1,1-difluoroethane	Not Available	Not Available
dichlorodifluoromethane	15,000 ppm	Not Available
trichlorofluoromethane	2,000 ppm	Not Available
propane	Not Available	Not Available
1-chloro-1,1,2,2-tetrafluoroethane	Not Available	Not Available
iso-butane	Not Available	Not Available
1-chloro-1,1-difluoroethane	Not Available	Not Available
octafluoropropane	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
1,1-difluoroethane	E	≤ 0.1 ppm
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.*	

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Individual protection measures, such as personal protective equipment	
Eye and face protection	▸ 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 lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▸ When handling sealed and suitably insulated cylinders wear cloth or leather gloves. ▸ Insulated gloves: ▸ NOTE: Insulated gloves should be loose fitting so that may be removed quickly if liquid is spilled upon them. Insulated gloves are not made to permit hands to be placed in the liquid; they provide only short-term protection from accidental contact with the liquid.
Body protection	See Other protection below
Other protection	▸ 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.

Respiratory protection

Type AX-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used
- 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.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Liquefied gas.

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Physical state	Liquified Gas	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Not Available	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	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. Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system. Common, generalised symptoms associated with non-toxic gas inhalation include : ▸ central nervous system effects such as headache, confusion, dizziness, progressive stupor, coma and seizures; ▸ respiratory system complications may include tachypnoea and dyspnoea; ▸ cardiovascular effects may include circulatory collapse and arrhythmias; ▸ gastrointestinal effects may also be present and may include mucous membrane irritation and nausea and vomiting.
Ingestion	Accidental ingestion of the material may be damaging to the health of the individual. Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Skin Contact	Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds 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. 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

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	hardening an 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).
Eye	Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Principal route of occupational exposure to the gas is by inhalation.

A-Gas Full Refrigerant Analysis	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
chlorodifluoromethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: 220000 ppm4h[2]	Not Available
1,1,1,2-tetrafluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: 359453.102 ppm4h[2]	Eye: adverse effect observed (irritating)[1]
		Skin: adverse effect observed (irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
pentafluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >709000 ppm4h[2]	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
difluoromethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >760000 ppm4h[2]	Not Available
	Oral (Mouse) LD50; 1810 mg/kg[2]	
1,1,1-trifluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >540000 ppm4h[2]	Not Available
1,1-difluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >437500 ppm4h[1]	Eye: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: 484 mg/kg[2]	Skin: no adverse effect observed (not irritating)[1]
dichlorodifluoromethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >800000 ppm4h[1]	Eye: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: >1000 mg/kg[1]	Skin: no adverse effect observed (not irritating)[1]
trichlorofluoromethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: 26200 ppm4h[2]	Not Available
	Oral (Rat) LD50: >15000 mg/kg[2]	
propane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: 364726.819 ppm4h[2]	Not Available
1-chloro-1,1,2,2-tetrafluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: 218559.496 ppm4h[2]	Not Available
iso-butane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: >13023 ppm4h[1]	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
1-chloro-1,1-difluoroethane	**TOXICITY**	**IRRITATION**
	Inhalation (Rat) LC50: 498731.343 ppm4h[2]	Not Available
octafluoropropane	**TOXICITY**	**IRRITATION**

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	dermal (rat) LD50: >2000 mg/kg[1]	Eye: no adverse effect observed (not irritating)[1]
	Inhalation (Rat) LC50: >4323.5 ppm4h[1]	Skin: no adverse effect observed (not irritating)[1]

Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*

CHLORODIFLUOROMETHANE	The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.
1,1,1,2-TETRAFLUOROETHANE	* with added oxygen - ZhongHao New Chemical Materials MSDS Excessive concentration can have a narcotic effect; inhalation of high concentrations of decomposition products can cause lung oedema.
PENTAFLUOROETHANE	Cardiac sensitisation threshold limit >245400 mg/m3 Anaesthetic effects threshold limit 490800 mg/m3 * DuPont SDS
1,1,1-TRIFLUOROETHANE	**NOTE:** Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.
1,1-DIFLUOROETHANE	For 1,1-difluoroethane: 1,1 -Difluoroethane is practically non-toxic following acute or chronic inhalation exposures. It is not a developmental or reproductive toxicant in rat studies and is negative for cancer in a two year rat inhalation study. It is not mutagenic in a *in vitro* bacterial reverse mutation assay and shows some weak clastogenicity in an *in vitro* human lymphocyte chromosome aberration test, but further evaluation of its ability to cause chromosome damage in and *in* vivo micronucleus test was negative. There is evidence that 1,1-difluoroethane can cause cardiac effects is some species, most notably heart arrhythmia in the dog.
TRICHLOROFLUOROMETHANE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
1-CHLORO-1,1,2,2-TETRAFLUOROETHANE	Inhalation (Guinea pig) LC: 1520000 mg/m3/2hNil reported
1-CHLORO-1,1-DIFLUOROETHANE	Inhalation (Mouse) LC50: 1758000 mg/m3/2h Nil reported - *(Toxicity data for approx. 45% gas, 55% air) for chlorodifluoroethane (syn 1-chloro-1,1-difluoroethane): **Acute toxicity** of 1-chloro-l,l-difluoroethane is low (LC50/6h >1,640,000 mg/m3 (400,000 ppm) in rats). Inhalation of high concentrations induced signs of lung irritation and Central Nervous System depressing effects of anesthetic type in rats and cardiac sensitisation in dogs. Consequently, 1-chloro 1,1 -difluoroethane may be hazardous to humans in case of accidental exposure to high concentrations occurring in confined area where replacement of air by the gas could at the same time reduce oxygen in the atmosphere. **Repeat dose toxicity:** In repeated inhalation exposure studies, 1-chloro -1,1-difluoroethane did not induce specific chronic toxicity in rats and dogs exposed 6 h/d, 5 d/week during several months (no target organs identified ; the no observed adverse effects were higher than 41 000 mg/m3 (10,000 ppm) in dogs exposed during 3 months and higher than 82 000 mg/m3 (20,000 ppm) in rats exposed for their lifetime). **Reproductive toxicity:** 1-Chloro 1,1-difluoroethane did not induce adverse effect on fertility of male mice exposed up to 82 000 mg/m3 (20,000 ppm) (in a Dominant lethal assay) and did not induce male and female lesions of sexual organs in rats and dogs exposed for several months. **Developmental toxicity:** the gas did not induce teratogenic or embryo/foetotoxicity effect and no maternal toxicity in two inhalation developmental toxicity studies where rats were exposed during pregnancy up to 41000 mg/m3 (10,000 ppm). **Carcinogenicity:** There was no carcinogenic effect in rats exposed for their life time (6h/d, 5d/week at concentrations up to 82 000 mg/m3 (20,000 ppm)). **Genotoxicity:** In genotoxicity studies, 1-chloro-1,1-difluoroethane was mutagenic in vitro on bacteria (Ames test) and gave equivocal results in a cell neoplastic transformation assay. However, in in vivo mutagenicity studies it was inactive (in a Dominant lethal assay and in a Bone Marrow cytogenetic assay in rats exposed by inhalation during 15 and 13 weeks respectively).
OCTAFLUOROPROPANE	For perfluoropropane (PF3) and other aliphatic perfluoroalkanes (PFAs) Perfluoroalkanes (PFAs) are very stable. They are not oxidized even by ozone to any appreciable extent; their atmospheric half-life greater than 5000 y PFAs are chemically inert; included in this family is Teflon (a polymeric, high-molecular-weight PFA). The major concern from exposure to high concentrations of gaseous PFAs is their potential for cardiac toxicity. Cardiac effects are known to occur when humans or animals are exposed to high concentrations of other fluorinated hydrocarbons (FCs), including Freons FCs, such as chlorofluorocarbons, could induce cardiac arrhythmias by sensitising the heart to epinephrine. For perfluorinated carbons (PFCs): PFCs are inert fluids composed of a complex combination of organic compounds resulting from the distillation of electrochemically fluorinated (ECF) compounds. This class consists of branched, linear and cyclic perfluorinated hydrocarbons having carbon numbers predominantly in the range of C5-Cl8 and boiling in the range of approximately 25 C-255 C (77 F-491 F). Perfluorinated amine and ether compounds may also be present Acute oral and inhalation toxicity tests with perfluoroalkanes show no toxicity at any dose tested, and even extremely high-dose intraperitoneal injection resulted in no lethality. In contrast, perfluoroalkenes (such as octafluorocyclopentene, perfluoroisobutylene, hexafluoropropene) have shown evidence of inhalation toxicity, in some cases, extreme. The material may produce peroxisome proliferation. Peroxisomes are single, membrane limited, cytoplasmic organelles that are found in the cells of animals, plants, fungi and protozoa. Peroxisome proliferators include certain hypolipidaemic drugs, phthalate ester plasticisers, industrial solvents, herbicides, food flavours, leukotriene D4 antagonists and hormones. Numerous studies in rats and mice have demonstrated the hepatocarcinogenic effects of peroxisome proliferators, and these compounds have been unequivocally established as carcinogens.
CHLORODIFLUOROMETHANE &	Chlorofluorocarbons may enter the human organism by inhalation, ingestion, or dermal contact. Inhalation is the most common and important route of entry, and exhalation is the most significant route of elimination from the body. Controlled studies with volunteer

Continued...

DICHLORODIFLUOROMETHANE & TRICHLOROFLUOROMETHANE & 1-CHLORO-1,1,2,2-TETRAFLUOROETHANE & 1-CHLORO-1,1-DIFLUOROETHANE	subjects and experimental animals have provided substantial data from exposures to a number of the chlorofluorocarbons. CFCs and HCFCs are known to sensitise the heart to adrenalin-induced arrhythmias. CFCs: · can be absorbed across the alveolar membrane, gastro- intestinal tract, or the skin; · are absorbed rapidly into the blood, following inhalation; · are absorbed into the blood at a decreasing rate as blood concentration increases; · once in the blood, are absorbed by various tissues; · will reach a stable blood level if exposure is sufficiently long, indicating an equilibrium between the air containing the chlorofluorocarbons and the blood; · are still absorbed by body tissue, after the initial blood level stabilization, and continue to enter the body. Studies with animals indicate that chlorofluorocarbons are rapidly absorbed after inhalation and are distributed by blood into practically all tissues of the body. The highest concentrations are usually found in fatty or lipid-containing tissues.
CHLORODIFLUOROMETHANE & 1-CHLORO-1,1,2,2-TETRAFLUOROETHANE & 1-CHLORO-1,1-DIFLUOROETHANE	For dichlorotrifloroethane (HCFC -123) and dichloropentafluoropropane (HCFC-225) Prolonged inhalation of high concentrations of HCFC-123 vapour may cause temporary nervous system depression with anesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness. With gross overexposure (greater than 20% concentration), a temporary alteration of the heart s electrical activity with irregular pulse, palpitations, or inadequate circulation may occur. Similar effects are observed in overexposure to CFC-11. Inhalation may cause liver effects with extended high-level exposures.
CHLORODIFLUOROMETHANE & 1,1,1,2-TETRAFLUOROETHANE & DICHLORODIFLUOROMETHANE & TRICHLOROFLUOROMETHANE & 1-CHLORO-1,1,2,2-TETRAFLUOROETHANE & 1-CHLORO-1,1-DIFLUOROETHANE	Disinfection by products (DBPs) re formed when disinfectants such as chlorine, chloramine, and ozone react with organic and inorganic matter in water. The observations that some DBPs such as trihalomethanes (THMs), di-/trichloroacetic acids, and 3-chloro-4-(dichloromethyl)-5-hydroxy-2(5H)-furanone (MX) are carcinogenic in animal studies have raised public concern over the possible adverse health effects of DBPs. To date, several hundred DBPs have been identified. Numerous haloalkanes and haloalkenes have been tested for carcinogenic and mutagenic activities. n general, the genotoxic potential is dependent on the nature, number, and position of halogen(s) and the molecular size of the compound.
PROPANE & OCTAFLUOROPROPANE	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✓	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✓ *– Data available to make classification*

SECTION 12 Ecological information

Toxicity

A-Gas Full Refrigerant Analysis

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

chlorodifluoromethane

Endpoint	Test Duration (hr)	Species	Value	Source
EC50(ECx)	96h	Algae or other aquatic plants	250mg/l	2
EC50	96h	Algae or other aquatic plants	250mg/l	2
EC50	48h	Crustacea	433mg/l	2

1,1,1,2-tetrafluoroethane

Endpoint	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	96h	Fish	300mg/l	Not Available
EC50	96h	Algae or other aquatic plants	142mg/l	2
EC50	72h	Algae or other aquatic plants	>114mg/l	2
EC50	48h	Crustacea	980mg/l	Not Available
LC50	96h	Fish	450mg/l	Not Available

pentafluoroethane

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	>114mg/l	2
EC50	96h	Algae or other aquatic plants	142mg/l	2
LC50	96h	Fish	>81.8mg/l	2

Continued...

	NOEC(ECx)	96h	Fish	10mg/l	2
	EC50	48h	Crustacea	>97.9mg/l	2

difluoromethane

Endpoint	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	96h	Fish	10mg/l	2
EC50	72h	Algae or other aquatic plants	>114mg/l	2
EC50	96h	Algae or other aquatic plants	142mg/l	2
EC50	48h	Crustacea	>97.9mg/l	2
LC50	96h	Fish	>81.8mg/l	2

1,1,1-trifluoroethane

Endpoint	Test Duration (hr)	Species	Value	Source
EC0(ECx)	96h	Algae or other aquatic plants	>44mg/l	2
EC50	72h	Algae or other aquatic plants	~71mg/l	2

1,1-difluoroethane

Endpoint	Test Duration (hr)	Species	Value	Source
NOEC(ECx)	504h	Crustacea	0.214mg/l	2
EC50	96h	Algae or other aquatic plants	47.755mg/l	2
EC50	48h	Crustacea	146.695mg/l	2
LC50	96h	Fish	291.31mg/l	2

dichlorodifluoromethane

Endpoint	Test Duration (hr)	Species	Value	Source
EC50(ECx)	96h	Algae or other aquatic plants	32.56mg/l	2
BCF	1008h	Fish	<2.3-10	7
EC50	72h	Algae or other aquatic plants	~67.216mg/l	2
EC50	96h	Algae or other aquatic plants	32.56mg/l	2
EC50	48h	Crustacea	49.6mg/l	2
LC50	96h	Fish	71.35mg/l	2

trichlorofluoromethane

Endpoint	Test Duration (hr)	Species	Value	Source
EC50(ECx)	48h	Crustacea	130mg/l	1
BCF	1008h	Fish	9.6-17	7
EC50	48h	Crustacea	130mg/l	1
LC50	96h	Fish	26-1000mg/l	Not Available

propane

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

1-chloro-1,1,2,2-tetrafluoroethane

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

iso-butane

Endpoint	Test Duration (hr)	Species	Value	Source
EC50(ECx)	96h	Algae or other aquatic plants	7.71mg/l	2
EC50	96h	Algae or other aquatic plants	7.71mg/l	2
LC50	96h	Fish	24.11mg/l	2

1-chloro-1,1-difluoroethane

Endpoint	Test Duration (hr)	Species	Value	Source
EC50(ECx)	96h	Algae or other aquatic plants	67.8mg/l	2
EC50	96h	Algae or other aquatic plants	67.8mg/l	2
EC50	48h	Crustacea	160mg/l	1
LC50	96h	Fish	220mg/l	2

octafluoropropane

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Continued...

On the basis of the available evidence concerning properties and predicted or observed environmental fate and behavior, the material may present a danger to the structure and/ or functioning of the stratospheric ozone layer.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
chlorodifluoromethane	LOW	LOW
1,1,1,2-tetrafluoroethane	HIGH	HIGH
pentafluoroethane	HIGH	HIGH
difluoromethane	LOW	LOW
1,1,1-trifluoroethane	HIGH	HIGH
1,1-difluoroethane	LOW	LOW
dichlorodifluoromethane	HIGH (Half-life = 360 days)	HIGH (Half-life = 882.5 days)
trichlorofluoromethane	HIGH (Half-life = 720 days)	HIGH (Half-life = 54166.67 days)
propane	LOW	LOW
1-chloro-1,1,2,2-tetrafluoroethane	HIGH	HIGH
iso-butane	HIGH	HIGH
1-chloro-1,1-difluoroethane	HIGH	HIGH
octafluoropropane	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
chlorodifluoromethane	LOW (LogKOW = 1.08)
1,1,1,2-tetrafluoroethane	LOW (LogKOW = 1.68)
pentafluoroethane	LOW (LogKOW = 1.5472)
difluoromethane	LOW (LogKOW = 0.2)
1,1,1-trifluoroethane	LOW (LogKOW = 1.7393)
1,1-difluoroethane	LOW (LogKOW = 0.75)
dichlorodifluoromethane	LOW (BCF = 10)
trichlorofluoromethane	LOW (BCF = 26)
propane	LOW (LogKOW = 2.36)
1-chloro-1,1,2,2-tetrafluoroethane	LOW (LogKOW = 1.8605)
iso-butane	LOW (BCF = 1.97)
1-chloro-1,1-difluoroethane	LOW (LogKOW = 2.0526)
octafluoropropane	LOW (LogKOW = 3.1211)

Mobility in soil

Ingredient	Mobility
chlorodifluoromethane	LOW (Log KOC = 23.74)
1,1,1,2-tetrafluoroethane	LOW (Log KOC = 96.63)
pentafluoroethane	LOW (Log KOC = 154.4)
difluoromethane	LOW (Log KOC = 23.74)
1,1,1-trifluoroethane	LOW (Log KOC = 48.64)
1,1-difluoroethane	LOW (Log KOC = 35.04)
dichlorodifluoromethane	LOW (Log KOC = 48.64)
trichlorofluoromethane	LOW (Log KOC = 48.64)
propane	LOW (Log KOC = 23.74)
1-chloro-1,1,2,2-tetrafluoroethane	LOW (Log KOC = 154.4)
iso-butane	LOW (Log KOC = 35.04)
1-chloro-1,1-difluoroethane	LOW (Log KOC = 48.64)
octafluoropropane	LOW (Log KOC = 1038)

Continued...

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	▸ 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 Transport information

Labels Required

	
Marine Pollutant	NO
HAZCHEM	2TE

Land transport (ADG)

14.1. **UN number or ID number**	1078
14.2. **UN proper shipping name**	REFRIGERANT GAS, N.O.S. (contains pentafluoroethane, trichlorofluoromethane, chlorodifluoromethane, 1,1-difluoroethane, dichlorodifluoromethane, iso-butane, propane, 1,1,1-trifluoroethane, octafluoropropane, 1-chloro-1,1-difluoroethane, difluoromethane, 1,1,1,2-tetrafluoroethane and 1-chloro-1,1,2,2-tetrafluoroethane)
14.3. **Transport hazard class(es)**	Class: 2.2 Subsidiary Hazard: Not Applicable
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
14.6. **Special precautions for user**	Special provisions: 274 Limited quantity: 120 ml

Air transport (ICAO-IATA / DGR)

14.1. **UN number**	1078
14.2. **UN proper shipping name**	Refrigerant gas, n.o.s. * (contains pentafluoroethane, trichlorofluoromethane, chlorodifluoromethane, 1,1-difluoroethane, dichlorodifluoromethane, iso-butane, propane, 1,1,1-trifluoroethane, octafluoropropane, 1-chloro-1,1-difluoroethane, difluoromethane, 1,1,1,2-tetrafluoroethane and 1-chloro-1,1,2,2-tetrafluoroethane)
14.3. **Transport hazard class(es)**	ICAO/IATA Class: 2.2 ICAO / IATA Subsidiary Hazard: Not Applicable ERG Code: 2L
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
14.6. **Special precautions for user**	Special provisions: Not Applicable Cargo Only Packing Instructions: 200 Cargo Only Maximum Qty / Pack: 150 kg Passenger and Cargo Packing Instructions: 200 Passenger and Cargo Maximum Qty / Pack: 75 kg Passenger and Cargo Limited Quantity Packing Instructions: Forbidden Passenger and Cargo Limited Maximum Qty / Pack: Forbidden

Sea transport (IMDG-Code / GGVSee)

14.1. **UN number**	1078
14.2. **UN proper shipping name**	REFRIGERANT GAS, N.O.S. (contains pentafluoroethane, trichlorofluoromethane, chlorodifluoromethane, 1,1-difluoroethane, dichlorodifluoromethane, iso-butane, propane, 1,1,1-trifluoroethane, octafluoropropane, 1-chloro-1,1-difluoroethane, difluoromethane, 1,1,1,2-tetrafluoroethane and 1-chloro-1,1,2,2-tetrafluoroethane)

Continued...

14.3. **Transport hazard class(es)**	IMDG Class	2.2
	IMDG Subsidiary Hazard	Not Applicable
14.4. **Packing group**	Not Applicable	
14.5 **Environmental hazard**	Not Applicable	
14.6. **Special precautions for user**	EMS Number	F-C , S-V
	Special provisions	274
	Limited Quantities	120 mL

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
chlorodifluoromethane	Not Available
1,1,1,2-tetrafluoroethane	Not Available
pentafluoroethane	Not Available
difluoromethane	Not Available
1,1,1-trifluoroethane	Not Available
1,1-difluoroethane	Not Available
dichlorodifluoromethane	Not Available
trichlorofluoromethane	Not Available
propane	Not Available
1-chloro-1,1,2,2-tetrafluoroethane	Not Available
iso-butane	Not Available
1-chloro-1,1-difluoroethane	Not Available
octafluoropropane	Not Available

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
chlorodifluoromethane	Not Available
1,1,1,2-tetrafluoroethane	Not Available
pentafluoroethane	Not Available
difluoromethane	Not Available
1,1,1-trifluoroethane	Not Available
1,1-difluoroethane	Not Available
dichlorodifluoromethane	Not Available
trichlorofluoromethane	Not Available
propane	Not Available
1-chloro-1,1,2,2-tetrafluoroethane	Not Available
iso-butane	Not Available
1-chloro-1,1-difluoroethane	Not Available
octafluoropropane	Not Available

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

chlorodifluoromethane is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

1,1,1,2-tetrafluoroethane is found on the following regulatory lists

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

Continued...

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

pentafluoroethane is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

difluoromethane is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

1,1,1-trifluoroethane is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

1,1-difluoroethane is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

dichlorodifluoromethane is found on the following regulatory lists

Australia - Victoria Environment Protection Regulations 2021 S.R. No. 47/2021 - Chapter 5 - Environmental management - Part 5.1 - Prohibited chemical substances
Australian Inventory of Industrial Chemicals (AIIC)
UNEP (United Nations Environment Programme) Montreal Protocol Ozone Depletors - Annex A

trichlorofluoromethane is found on the following regulatory lists

Australia - Victoria Environment Protection Regulations 2021 S.R. No. 47/2021 - Chapter 5 - Environmental management - Part 5.1 - Prohibited chemical substances
Australian Inventory of Industrial Chemicals (AIIC)
UNEP (United Nations Environment Programme) Montreal Protocol Ozone Depletors - Annex A

propane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)

1-chloro-1,1,2,2-tetrafluoroethane is found on the following regulatory lists

Not Applicable

iso-butane is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List

1-chloro-1,1-difluoroethane is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

octafluoropropane is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

Additional Regulatory Information

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (1-chloro-1,1,2,2-tetrafluoroethane)
Canada - DSL	Yes
Canada - NDSL	No (chlorodifluoromethane; 1,1,1,2-tetrafluoroethane; pentafluoroethane; difluoromethane; 1,1,1-trifluoroethane; 1,1-difluoroethane; dichlorodifluoromethane; trichlorofluoromethane; propane; 1-chloro-1,1,2,2-tetrafluoroethane; iso-butane; 1-chloro-1,1-difluoroethane; octafluoropropane)
China - IECSC	No (difluoromethane)
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (1-chloro-1,1,2,2-tetrafluoroethane)
Korea - KECI	No (1-chloro-1,1,2,2-tetrafluoroethane)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (1-chloro-1,1,2,2-tetrafluoroethane)
USA - TSCA	Yes
Taiwan - TCSI	No (1-chloro-1,1,2,2-tetrafluoroethane)
Mexico - INSQ	No (1-chloro-1,1,2,2-tetrafluoroethane)
Vietnam - NCI	No (dichlorodifluoromethane; 1-chloro-1,1,2,2-tetrafluoroethane; octafluoropropane)

Continued...

National Inventory	Status
Russia - FBEPH	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

SECTION 16 Other information

Revision Date	23/12/2022
Initial Date	11/08/2010

SDS Version Summary

Version	Date of Update	Sections Updated
7.1	01/11/2019	One-off system update. NOTE: This may or may not change the GHS classification
8.1	23/12/2022	Classification review due to GHS Revision change.

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.

The 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.

Definitions and abbreviations

- PC—TWA: Permissible Concentration-Time Weighted Average
- PC—STEL: Permissible Concentration-Short Term Exposure Limit
- IARC: International Agency for Research on Cancer
- ACGIH: American Conference of Governmental Industrial Hygienists
- STEL: Short Term Exposure Limit
- TEEL: Temporary Emergency Exposure Limit。
- IDLH: Immediately Dangerous to Life or Health Concentrations
- ES: Exposure Standard
- OSF: Odour Safety Factor
- NOAEL: No Observed Adverse Effect Level
- LOAEL: Lowest Observed Adverse Effect Level
- TLV: Threshold Limit Value
- LOD: Limit Of Detection
- OTV: Odour Threshold Value
- BCF: BioConcentration Factors
- BEI: Biological Exposure Index
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration

- AIIC: Australian Inventory of Industrial Chemicals
- DSL: Domestic Substances List
- NDSL: Non-Domestic Substances List
- IECSC: Inventory of Existing Chemical Substance in China
- EINECS: European INventory of Existing Commercial chemical Substances
- ELINCS: European List of Notified Chemical Substances
- NLP: No-Longer Polymers
- ENCS: Existing and New Chemical Substances Inventory
- KECI: Korea Existing Chemicals Inventory
- NZIoC: New Zealand Inventory of Chemicals
- PICCS: Philippine Inventory of Chemicals and Chemical Substances
- TSCA: Toxic Substances Control Act
- TCSI: Taiwan Chemical Substance Inventory
- INSQ: Inventario Nacional de Sustancias Químicas
- NCI: National Chemical Inventory
- FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances