

## A-Gas R134a

A-Gas (Australia) Pty Ltd

Chemwatch Hazard Alert Code: 1

Chemwatch: 7568-17

Issue Date: 16/03/2017

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Safety Data Sheet according to WHS and ADG requirements

S.GHS.AUS.EN

### SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

#### Product Identifier

Product name	A-Gas R134a
Synonyms	HFC-134a; Suva 134a
Proper shipping name	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)
Other means of identification	Not Available

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

Relevant identified uses	Wide use in household and commercial refrigeration and automotive air-conditioning.
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#### Details of the supplier of the safety data sheet

Registered company name	A-Gas (Australia) Pty Ltd
Address	9-11 Oxford Road, Laverton North VIC 3026 Australia
Telephone	[+61] (0) 3 93689222
Fax	[+61] (0) 3 93689233
Website	www.agas.com
Email	info.au@agas.com

#### Emergency telephone number

Association / Organisation	TOLL CHEMICAL LOGISTICS
Emergency telephone numbers	TOLL: [+61] 1800 024 973
Other emergency telephone numbers	Not Available

### SECTION 2 HAZARDS IDENTIFICATION

#### Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification <sup>[1]</sup>	Gas under Pressure (Liquefied gas)
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HSIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

#### Label elements

Hazard pictogram(s)	
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SIGNAL WORD	<b>WARNING</b>
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#### Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.
AUH044	Risk of explosion if heated under confinement.

#### Precautionary statement(s) Prevention

Not Applicable

#### Precautionary statement(s) Response

Not Applicable

### Precautionary statement(s) Storage

P410+P403	Protect from sunlight. Store in a well-ventilated place.
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### Precautionary statement(s) Disposal

Not Applicable

## SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

### Substances

See section below for composition of Mixtures

### Mixtures

CAS No	%[weight]	Name
811-97-2	>60	<u>R-134A</u>

## SECTION 4 FIRST AID MEASURES

### Description of first aid measures

<b>Eye Contact</b>	<ul style="list-style-type: none"><li>▶ If product comes in contact with eyes remove the patient from gas source or contaminated area.</li><li>▶ Take the patient to the nearest eye wash, shower or other source of clean water.</li><li>▶ Open the eyelid(s) wide to allow the material to evaporate.</li><li>▶ 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.</li><li>▶ 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.</li><li>▶ 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)</li><li>▶ Transport to hospital or doctor.</li><li>▶ Even when no pain persists and vision is good, a doctor should examine the eye as delayed damage may occur.</li><li>▶ If the patient cannot tolerate light, protect the eyes with a clean, loosely tied bandage.</li><li>▶ Ensure verbal communication and physical contact with the patient.</li></ul> <p><b>DO NOT</b> allow the patient to rub the eyes <b>DO NOT</b> allow the patient to tightly shut the eyes <b>DO NOT</b> introduce oil or ointment into the eye(s) without medical advice <b>DO NOT</b> use hot or tepid water.</p>
<b>Skin Contact</b>	<p>If skin contact occurs:</p> <ul style="list-style-type: none"><li>▶ Immediately remove all contaminated clothing, including footwear.</li><li>▶ Flush skin and hair with running water (and soap if available).</li><li>▶ Seek medical attention in event of irritation.</li></ul>
<b>Inhalation</b>	<ul style="list-style-type: none"><li>▶ Following exposure to gas, remove the patient from the gas source or contaminated area.</li><li>▶ NOTE: Personal Protective Equipment (PPE), including positive pressure self-contained breathing apparatus may be required to assure the safety of the rescuer.</li><li>▶ Prostheses such as false teeth, which may block the airway, should be removed, where possible, prior to initiating first aid procedures.</li><li>▶ If the patient is not breathing spontaneously, administer rescue breathing.</li><li>▶ If the patient does not have a pulse, administer CPR.</li><li>▶ If medical oxygen and appropriately trained personnel are available, administer 100% oxygen.</li><li>▶ Summon an emergency ambulance. If an ambulance is not available, contact a physician, hospital, or Poison Control Centre for further instruction.</li><li>▶ Keep the patient warm, comfortable and at rest while awaiting medical care.</li><li>▶ <b>MONITOR THE BREATHING AND PULSE, CONTINUOUSLY.</b></li><li>▶ Administer rescue breathing (preferably with a demand-valve resuscitator, bag-valve mask-device, or pocket mask as trained) or CPR if necessary.</li></ul>
<b>Ingestion</b>	<p>Not considered a normal route of entry.</p> <ul style="list-style-type: none"><li>▶ Avoid giving milk or oils.</li><li>▶ Avoid giving alcohol.</li></ul>

### Indication of any immediate medical attention and special treatment needed

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

For gas exposures:

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BASIC TREATMENT  
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- 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.

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ADVANCED TREATMENT  
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- 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.*

*EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994*

## SECTION 5 FIREFIGHTING MEASURES

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### 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

<b>Fire Incompatibility</b>	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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### Advice for firefighters

<b>Fire Fighting</b>	<p>----- GENERAL -----</p> <ul style="list-style-type: none"> <li>▸ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▸ Wear breathing apparatus and protective gloves.</li> <li>▸ Fight fire from a safe distance, with adequate cover.</li> <li>▸ Use water delivered as a fine spray to control fire and cool adjacent area.</li> </ul>
<b>Fire/Explosion Hazard</b>	<ul style="list-style-type: none"> <li>▸ Containers may explode when heated - Ruptured cylinders may rocket</li> <li>▸ Fire exposed containers may vent contents through pressure relief devices.</li> <li>▸ High concentrations of gas may cause asphyxiation without warning.</li> <li>▸ May decompose explosively when heated or involved in fire.</li> <li>▸ Contact with gas may cause burns, severe injury and/ or frostbite.</li> </ul> <p>Decomposition may produce toxic fumes of: carbon monoxide (CO) carbon dioxide (CO2) hydrogen fluoride</p> <p><b>Contains low boiling substance:</b> Closed containers may rupture due to pressure buildup under fire conditions.  Although not flammable in air at temperatures up to 100 deg. C at atmospheric temperature, mixtures with high concentrations of air at elevated pressure and / or temperature can become combustible in the presence of an ignition source. The material can also become combustible in an oxygen enriched environment (oxygen concentrations greater than in air). Whether air-mixtures or oxygen-mixtures become combustible depends on temperature, pressure and oxygen concentration.  general the material should not be allowed to exist with air above atmospheric pressure or at high temperatures, or in an oxygen enriched environment. For  example do NOT mix with air under pressure for leak testing or other purposes.</p>
<b>HAZCHEM</b>	2TE

## SECTION 6 ACCIDENTAL RELEASE MEASURES

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### Personal precautions, protective equipment and emergency procedures

See section 8

## Environmental precautions

See section 12

## Methods and material for containment and cleaning up

<b>Minor Spills</b>	<ul style="list-style-type: none"> <li>▶ Avoid breathing vapour and any contact with liquid or gas. Protective equipment including respirator should be used.</li> <li>▶ <b>DO NOT enter confined spaces where gas may have accumulated.</b></li> <li>▶ Increase ventilation.</li> </ul>
<b>Major Spills</b>	<ul style="list-style-type: none"> <li>▶ Clear area of all unprotected personnel and move upwind.</li> <li>▶ Alert Emergency Authority and advise them of the location and nature of hazard.</li> <li>▶ Wear breathing apparatus and protective gloves.</li> <li>▶ Prevent by any means available, spillage from entering drains and water-courses.</li> </ul>

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

## SECTION 7 HANDLING AND STORAGE

### Precautions for safe handling

<b>Safe handling</b>	<ul style="list-style-type: none"> <li>▶ Vented gas is more dense than air and may collect in pits, basements. <ul style="list-style-type: none"> <li>·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</li> <li>·The tubing network design connecting gas cylinders to the delivery system should include appropriate pressure indicators and vacuum or suction lines.</li> <li>·Fully-welded types of pressure gauges, where the bourdon tube sensing element is welded to the gauge body, are recommended.</li> <li>·Before connecting gas cylinders, ensure manifold is mechanically secure and does not containing another gas.</li> </ul> </li> <li>▶ <b>DO NOT transfer gas from one cylinder to another.</b></li> </ul> <p> Contact of welding or soldering torch flame with high concentration of refrigerant can result in visible changes in the size and colour of torch flames. This flame effect will only occur in concentrations of product well above the recommended exposure limit.; therefore stop all work and ventilate to disperse refrigerant vapours from the work are before using any open flames.</p>
<b>Other information</b>	<ul style="list-style-type: none"> <li>▶ Cylinders should be stored in a purpose-built compound with good ventilation, preferably in the open.</li> <li>▶ Such compounds should be sited and built in accordance with statutory requirements.</li> <li>▶ The storage compound should be kept clear and access restricted to authorised personnel only.</li> <li>▶ Cylinders stored in the open should be protected against rust and extremes of weather.</li> </ul>

### Conditions for safe storage, including any incompatibilities

<b>Suitable container</b>	<ul style="list-style-type: none"> <li>▶ <b>DO NOT use aluminium or galvanised containers</b></li> <li>▶ Cylinder: <ul style="list-style-type: none"> <li>▶ Ensure the use of equipment rated for cylinder pressure.</li> <li>▶ Ensure the use of compatible materials of construction.</li> <li>▶ Valve protection cap to be in place until cylinder is secured, connected.</li> <li>▶ Cylinder must be properly secured either in use or in storage.</li> </ul> </li> </ul>
<b>Storage incompatibility</b>	<p>As a general rule, hydrofluorocarbons tend to be flammable unless they contain more fluorine atoms than hydrogen atoms.</p> <ul style="list-style-type: none"> <li>▶ Avoid reaction with oxidising agents</li> </ul>

## 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	1,1,1,2-tetrafluoroethane	1,1,1,2-Tetrafluoroethane	1000 ppm / 4240 mg/m3	Not Available	Not Available	Not Available

#### EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
R-134A	HFC 134a; (Tetrafluoroethane, 1,1,1,2-)	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
R-134A	Not Available	Not Available

### Exposure controls

<b>Appropriate engineering controls</b>	<p>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:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that</p>
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	strategically "adds" and "removes" air in the work environment.
<b>Personal protection</b>	
<b>Eye and face protection</b>	<ul style="list-style-type: none"> <li>▶ Chemical goggles.</li> <li>▶ Full face shield may be required for supplementary but never for primary protection of eyes.</li> <li>▶ 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.</li> </ul>
<b>Skin protection</b>	See Hand protection below
<b>Hands/feet protection</b>	<ul style="list-style-type: none"> <li>▶ When handling sealed and suitably insulated cylinders wear cloth or leather gloves.</li> <li>▶ Insulated gloves:</li> </ul> <p>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.</p>
<b>Body protection</b>	See Other protection below
<b>Other protection</b>	<ul style="list-style-type: none"> <li>▶ 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)</li> <li>▶ Air-supplied breathing apparatus is required where release of gas from primary containment is either suspected or demonstrated.</li> <li>▶ Protective overalls, closely fitted at neck and wrist.</li> <li>▶ Eye-wash unit.</li> <li>▶ Ensure availability of lifeline in confined spaces.</li> <li>▶ Staff should be trained in all aspects of rescue work.</li> </ul>

## Respiratory protection

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

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 5 x ES	Air-line*	AX-2	AX-PAPR-2 ^
up to 10 x ES	-	AX-3	-
10+ x ES	-	Air-line**	-

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

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO<sub>2</sub>), G = Agricultural chemicals, K = Ammonia(NH<sub>3</sub>), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

<b>Appearance</b>	Colourless pressurised liquefied gas with a slight ether-like odour; partially mixes with water.		
<b>Physical state</b>	Liquefied Gas	<b>Relative density (Water = 1)</b>	1.21 @ 25 deg.C
<b>Odour</b>	Not Available	<b>Partition coefficient n-octanol / water</b>	Not Available
<b>Odour threshold</b>	Not Available	<b>Auto-ignition temperature (°C)</b>	Not Applicable
<b>pH (as supplied)</b>	Not Available	<b>Decomposition temperature</b>	Not Available
<b>Melting point / freezing point (°C)</b>	-103 - -101	<b>Viscosity (cSt)</b>	Not Available
<b>Initial boiling point and boiling range (°C)</b>	-26.1	<b>Molecular weight (g/mol)</b>	102.03
<b>Flash point (°C)</b>	Not Applicable	<b>Taste</b>	Not Available
<b>Evaporation rate</b>	>1	<b>Explosive properties</b>	Not Available
<b>Flammability</b>	Not Applicable	<b>Oxidising properties</b>	Not Available
<b>Upper Explosive Limit (%)</b>	Not Applicable	<b>Surface Tension (dyn/cm or mN/m)</b>	Not Available
<b>Lower Explosive Limit (%)</b>	Not Applicable	<b>Volatile Component (%vol)</b>	100
<b>Vapour pressure (kPa)</b>	665 @ 25 deg C	<b>Gas group</b>	Not Available
<b>Solubility in water</b>	Partly miscible	<b>pH as a solution (1%)</b>	Not Available
<b>Vapour density (Air = 1)</b>	3.6 @ 25 deg C	<b>VOC g/L</b>	Not Available

## SECTION 10 STABILITY AND REACTIVITY

<b>Reactivity</b>	See section 7
<b>Chemical stability</b>	<ul style="list-style-type: none"> <li>▶ Unstable in the presence of incompatible materials.</li> <li>▶ Product is considered stable.</li> <li>▶ Hazardous polymerisation will not occur.</li> </ul>
<b>Possibility of hazardous reactions</b>	See section 7
<b>Conditions to avoid</b>	See section 7
<b>Incompatible materials</b>	See section 7
<b>Hazardous decomposition products</b>	See section 5

## SECTION 11 TOXICOLOGICAL INFORMATION

### Information on toxicological effects

<b>Inhaled</b>	<p>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.</p> <p>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.</p> <p>Inhalation of non-toxic gases may cause:</p> <ul style="list-style-type: none"> <li>▶ CNS effects: headache, confusion, dizziness, stupor, seizures and coma;</li> <li>▶ respiratory: shortness of breath and rapid breathing;</li> <li>▶ cardiovascular: collapse and irregular heart beats;</li> <li>▶ gastrointestinal: mucous membrane irritation, nausea and vomiting.</li> </ul> <p>Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.</p>
<b>Ingestion</b>	<p>Overexposure is unlikely in this form.</p> <p>Not normally a hazard due to physical form of product.</p> <p>Considered an unlikely route of entry in commercial/industrial environments</p>
<b>Skin Contact</b>	<p>Fluorocarbons remove natural oils from the skin, causing irritation, dryness and sensitivity.</p> <p>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).</p> <p>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.</p>
<b>Eye</b>	<p>Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p> <p>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).</p>
<b>Chronic</b>	<p>Main route of exposure to the gas in the workplace is by inhalation.</p> <p>Fluorocarbons can cause an increased risk of cancer, spontaneous abortion and birth defects.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</p>

<b>A-Gas R134a</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>R-134A</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation (rat) LC50: 1500 mg/l/4h <sup>[2]</sup>	Not Available
<b>Legend:</b>	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	

<b>A-Gas R134a</b>	Acute toxicity - Oral route, LD 50, not applicable - Dermal route, LD 50, not applicable - Inhalation, LC 50, 4 h, rat, > 2.086 g/l Irritation - Rabbit, slightly irritant (skin) - Rabbit, mild eye irritation (eyes) Sensitization - Guinea Pig, Did not cause sensitization on laboratory animals. Chronic toxicity - Inhalation, after a single exposure, dog, NOEL: >= 7.5%, cardiac sensitization following adrenergic stimulation - Inhalation, Prolonged exposure, rat, Target organ: testes, NOEL: >= 0.209 g/l Remark: Leydig cells/benign tumours
<b>R-134A</b>	Disinfection byproducts (DBPs) are formed when disinfectants such as chlorine, chloramines and ozone react with organic and inorganic matter in water. Animal studies have shown that some DBPs cause cancer. To date, several hundred DBPs have been identified. Numerous haloalkanes and haloalkenes have been tested for cancer-causing and mutation-causing activities. * 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.

<b>Acute Toxicity</b>	✗	<b>Carcinogenicity</b>	✗
<b>Skin Irritation/Corrosion</b>	✗	<b>Reproductivity</b>	✗

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 R134a	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available

  

R-134A	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	29.671mg/L	3
	EC50	48	Crustacea	980mg/L	5
	EC50	96	Algae or other aquatic plants	97.260mg/L	3
	NOEC	72	Algae or other aquatic plants	ca.13.2mg/L	2

**Legend:** *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 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*

**DO NOT** discharge into sewer or waterways.

### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
R-134A	HIGH	HIGH

### Bioaccumulative potential

Ingredient	Bioaccumulation
R-134A	LOW (LogKOW = 1.68)

### Mobility in soil

Ingredient	Mobility
R-134A	LOW (KOC = 96.63)

## SECTION 13 DISPOSAL CONSIDERATIONS

### Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> <li>▶ Evaporate residue at an approved site.</li> <li>▶ Return empty containers to supplier. If containers are marked non-returnable establish means of disposal with manufacturer prior to purchase.</li> <li>▶ Ensure damaged or non-returnable cylinders are gas-free before disposal.</li> </ul>   Dispose in compliance with local / federal and national regulations.
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## SECTION 14 TRANSPORT INFORMATION

### Labels Required

	
Marine Pollutant	NO Not Applicable
HAZCHEM	2TE

### Land transport (ADG)

<b>UN number</b>	3159				
<b>UN proper shipping name</b>	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)				
<b>Transport hazard class(es)</b>	<table border="1"> <tr> <td>Class</td> <td>2.2</td> </tr> <tr> <td>Subrisk</td> <td>Not Applicable</td> </tr> </table>	Class	2.2	Subrisk	Not Applicable
Class	2.2				
Subrisk	Not Applicable				
<b>Packing group</b>	Not Applicable				
<b>Environmental hazard</b>	Not Applicable				
<b>Special precautions for user</b>	<table border="1"> <tr> <td>Special provisions</td> <td>Not Applicable</td> </tr> <tr> <td>Limited quantity</td> <td>120 ml</td> </tr> </table>	Special provisions	Not Applicable	Limited quantity	120 ml
Special provisions	Not Applicable				
Limited quantity	120 ml				

#### Air transport (ICAO-IATA / DGR)

<b>UN number</b>	3159														
<b>UN proper shipping name</b>	Refrigerant gas R 134a; 1,1,1,2-Tetrafluoroethane														
<b>Transport hazard class(es)</b>	<table border="1"> <tr> <td>ICAO/IATA Class</td> <td>2.2</td> </tr> <tr> <td>ICAO / IATA Subrisk</td> <td>Not Applicable</td> </tr> <tr> <td>ERG Code</td> <td>2L</td> </tr> </table>	ICAO/IATA Class	2.2	ICAO / IATA Subrisk	Not Applicable	ERG Code	2L								
ICAO/IATA Class	2.2														
ICAO / IATA Subrisk	Not Applicable														
ERG Code	2L														
<b>Packing group</b>	Not Applicable														
<b>Environmental hazard</b>	Not Applicable														
<b>Special precautions for user</b>	<table border="1"> <tr> <td>Special provisions</td> <td>Not Applicable</td> </tr> <tr> <td>Cargo Only Packing Instructions</td> <td>200</td> </tr> <tr> <td>Cargo Only Maximum Qty / Pack</td> <td>150 kg</td> </tr> <tr> <td>Passenger and Cargo Packing Instructions</td> <td>200</td> </tr> <tr> <td>Passenger and Cargo Maximum Qty / Pack</td> <td>75 kg</td> </tr> <tr> <td>Passenger and Cargo Limited Quantity Packing Instructions</td> <td>Forbidden</td> </tr> <tr> <td>Passenger and Cargo Limited Maximum Qty / Pack</td> <td>Forbidden</td> </tr> </table>	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
Special provisions	Not Applicable														
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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)

<b>UN number</b>	3159						
<b>UN proper shipping name</b>	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)						
<b>Transport hazard class(es)</b>	<table border="1"> <tr> <td>IMDG Class</td> <td>2.2</td> </tr> <tr> <td>IMDG Subrisk</td> <td>Not Applicable</td> </tr> </table>	IMDG Class	2.2	IMDG Subrisk	Not Applicable		
IMDG Class	2.2						
IMDG Subrisk	Not Applicable						
<b>Packing group</b>	Not Applicable						
<b>Environmental hazard</b>	Not Applicable						
<b>Special precautions for user</b>	<table border="1"> <tr> <td>EMS Number</td> <td>F-C, S-V</td> </tr> <tr> <td>Special provisions</td> <td>Not Applicable</td> </tr> <tr> <td>Limited Quantities</td> <td>120 mL</td> </tr> </table>	EMS Number	F-C, S-V	Special provisions	Not Applicable	Limited Quantities	120 mL
EMS Number	F-C, S-V						
Special provisions	Not Applicable						
Limited Quantities	120 mL						

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

Not Applicable

### SECTION 15 REGULATORY INFORMATION

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

##### R-134A(811-97-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List	International Air Transport Association (IATA) Dangerous Goods Regulations
Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes	International Maritime Dangerous Goods Requirements (IMDG Code)
Australia Dangerous Goods Code (ADG Code) - Packing Instruction - Liquefied and Dissolved Gases	United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Chinese)
Australia Exposure Standards	United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (English)
Australia Inventory of Chemical Substances (AICS)	United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (Spanish)

#### National Inventory Status

National Inventory	Status
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Australia - AICS	Yes
Canada - DSL	Yes
Canada - NDSL	No (R-134A)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
<b>Legend:</b>	<i>Yes = All ingredients are on the inventory No = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)</i>

## SECTION 16 OTHER INFORMATION

<b>Revision Date</b>	16/03/2017
<b>Initial Date</b>	Not Available

### SDS Version Summary

Version	Issue Date	Sections Updated
10.1.1.1	15/03/2017	Acute Health (inhaled), Appearance, Chronic Health, Classification, Ingredients, Physical Properties, Storage (suitable container), Synonyms
11.1.1.1	16/03/2017	Acute Health (eye), Acute Health (inhaled), Acute Health (swallowed), Chronic Health, Classification, Ingredients, Storage (storage incompatibility)

### 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  
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

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