



## A-GAS R410A

### A-Gas (U.S. Headquarters)

Chemwatch: 6100-24

Version No: 9.1

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: 1

Issue Date: 06/08/2019

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L.GHS.USA.EN

#### SECTION 1 Identification

##### Product Identifier

Product name	A-GAS R410A
Synonyms	Suva 9100; R-410A; Suva R-410A; 410A; HFC 410A
Proper shipping name	Liquefied gas, n.o.s. (contains pentafluoroethane and difluoromethane)
Chemical formula	Not Available
Other means of identification	Not Available
CAS number	133023-17-3

##### Recommended use of the chemical and restrictions on use

Relevant identified uses	Refrigerant, for professional users only
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##### Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	A-Gas (U.S. Headquarters)
Address	1100 Haskins Rd. Bowling Green, OH 43402 United States
Telephone	14198678990
Fax	1-419-867-3279
Website	<a href="http://www.agas.com/us">www.agas.com/us</a>
Email	<a href="mailto:tammy.myers@agas.com">tammy.myers@agas.com</a>

##### Emergency phone number

Association / Organisation	PERS	CHEMWATCH EMERGENCY RESPONSE
Emergency telephone numbers	1-800-633-8253	+1 855-237-5573
Other emergency telephone numbers	International 1-801-629-0667	+61 3 9573 3188

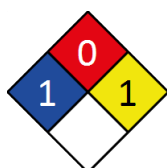
Once connected and if the message is not in your preferred language then please dial 01

Una vez conectado y si el mensaje no está en su idioma preferido, por favor marque 02

#### SECTION 2 Hazard(s) identification

##### Classification of the substance or mixture

NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

Classification	Simple Asphyxiant, Gases Under Pressure (Liquefied Gas)
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##### Label elements

Hazard pictogram(s)



Signal word

Warning

## Hazard statement(s)

H280

Contains gas under pressure; may explode if heated.

May displace oxygen and cause rapid suffocation

## Hazard(s) not otherwise classified

Not Applicable

## 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 label before use.

## 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.

## Precautionary statement(s) Disposal

Not Applicable

Not Applicable

## SECTION 3 Composition / information on ingredients

## Substances

CAS No	%[weight]	Name
75-10-5	30-60	<u>difluoromethane</u>
354-33-6	30-60	<u>pentafluoroethane</u>

## Mixtures

See section above for composition of Substances

## 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.
- ▶ 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

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	<p><b>DO NOT</b> introduce oil or ointment into the eye(s) without medical advice</p> <p><b>DO NOT</b> use hot or tepid water.</p>
<b>Skin Contact</b>	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> <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>	<ul style="list-style-type: none"> <li>Not considered a normal route of entry.</li> <li>For advice, contact a Poisons Information Centre or a doctor.</li> <li>Avoid giving milk or oils.</li> <li>Avoid giving alcohol.</li> </ul>

**Most important symptoms and effects, both acute and delayed**

See Section 11

**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:

**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.

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- 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.

### 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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### Special protective equipment and precautions for fire-fighters

<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:</p> <p>carbon monoxide (CO)</p> <p>carbon dioxide (CO<sub>2</sub>)</p> <p>hydrogen chloride</p> <p>phosgene</p> <p>hydrogen fluoride</p> <p>other pyrolysis products typical of burning organic material.</p> <p><b>Contains low boiling substance:</b> Closed containers may rupture due to pressure buildup under fire conditions.</p>

## 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

<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</b> enter confined spaces where gas may have accumulated.</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> <li>▸ Remove leaking cylinders to a safe place.</li> <li>▸ Fit vent pipes. Release pressure under safe, controlled conditions</li> <li>▸ Burn issuing gas at vent pipes.</li> <li>▸ <b>DO NOT</b> exert excessive pressure on valve; <b>DO NOT</b> attempt to operate damaged valve.</li> </ul>

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

## SECTION 7 Handling and storage

## Precautions for safe handling

Safe handling	<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 contain another gas. <ul style="list-style-type: none"> <li>Vented gas is more dense than air and may collect in pits, basements.</li> </ul> </li> </ul>
Other information	<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> <p><b>DO NOT store above 50 deg. C.</b></p>

## Conditions for safe storage, including any incompatibilities

Suitable container	<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>
Storage incompatibility	<ul style="list-style-type: none"> <li>Avoid reaction with oxidising agents</li> <li>Avoid magnesium, aluminium and their alloys, brass and steel.</li> </ul>



X — Must not be stored together

O — May be stored together with specific precautions

+ — 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

Not Available

## Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
difluoromethane	3,000 ppm	6,500 ppm	39,000 ppm

Ingredient	Original IDLH	Revised IDLH
difluoromethane	Not Available	Not Available
pentafluoroethane	Not Available	Not Available

## MATERIAL DATA

May act as simple asphyxiants; these are gases which, when present in high concentrations, reduce the oxygen content in air below that required to support breathing, consciousness and life; loss of consciousness, with death by suffocation may rapidly occur in an oxygen deficient atmosphere.


**CARE:** Most simple asphyxiants are odourless or possess low odour and there is no warning on entry into an oxygen deficient atmosphere. If there is any doubt, oxygen content can be checked simply and quickly. It may not be appropriate to only recommend an exposure standard for simple asphyxiants rather it is essential that sufficient oxygen be maintained.

## Exposure controls

Appropriate engineering controls	<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>
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## A-GAS R410A

	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.
<b>Personal protection</b>	
<b>Eye and face protection</b>	<ul style="list-style-type: none"> <li>▸ Safety glasses with side shields</li> <li>▸ Chemical goggles.</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. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience.</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> </ul>
<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)

**SECTION 9 Physical and chemical properties****Information on basic physical and chemical properties**

<b>Appearance</b>	Colourless liquefied gas with slight ether-like odour.		
<b>Physical state</b>	Liquefied Gas	<b>Relative density (Water = 1)</b>	1.062 @ 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 Available
<b>pH (as supplied)</b>	~7	<b>Decomposition temperature</b>	Not Available
<b>Melting point / freezing point (°C)</b>	Not Available	<b>Viscosity (cSt)</b>	Not Available
<b>Initial boiling point and boiling range (°C)</b>	-51.6	<b>Molecular weight (g/mol)</b>	Not Applicable
<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>	Not Available
<b>Vapour pressure (kPa)</b>	1653 @ 25 deg C, 3052 @ 50 deg C	<b>Gas group</b>	Not Available
<b>Solubility in water</b>	Not Available	<b>pH as a solution (Not Available%)</b>	Not Applicable
<b>Vapour density (Air = 1)</b>	Not Available	<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> <li>▸ Extremely high temperatures.</li> </ul>
<b>Possibility of hazardous reactions</b>	See section 7

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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	<p>Symptoms of asphyxia (suffocation) may include headache, dizziness, shortness of breath, muscular weakness, drowsiness and ringing in the ears. If the asphyxia is allowed to progress, there may be nausea and vomiting, further physical weakness and unconsciousness and, finally, convulsions, coma and death. Significant concentrations of the non-toxic gas reduce the oxygen level in the air. As the amount of oxygen is reduced from 21 to 14 volume %, the pulse rate accelerates and the rate and volume of breathing increase.</p> <p>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.</p> <p>Limited evidence exists, or practical experience predicts, that the material produces irritation of the respiratory system in a significant number of individuals following inhalation.</p>
Ingestion	<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>
Skin Contact	<p>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.</p> <p>In common with other halogenated aliphatics, fluorocarbons may cause dermal problems due to a tendency to remove natural oils from the skin causing irritation and the development of dry, sensitive skin. They do not appear to be appreciably absorbed.</p>
Eye	<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>
Chronic	<p>Principal route of occupational exposure to the gas is by inhalation.</p> <p>It is generally accepted that the fluorocarbons are less toxic than the corresponding halogenated aliphatic based on chlorine. Repeated inhalation exposure to the fluorocarbon FC-11 does not produce pathologic lesions of the liver and other visceral organs in experimental animals. There has been conjecture in non-scientific publications that fluorocarbons may cause leukemia, cancer, sterility and birth defects; these have not been verified by current research. The high incidence of cancer, spontaneous abortion and congenital anomalies amongst hospital personnel, repeatedly exposed to fluorine-containing general anaesthetics, has caused some scientists to call for a lowering of the fluorocarbon exposure standard to 5 ppm since some are mutagens.</p> <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p>

A-GAS R410A	TOXICITY	IRRITATION
	Not Available	Not Available
difluoromethane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; >760000 ppm4h <sup>[2]</sup>	Not Available
pentafluoroethane	TOXICITY	IRRITATION
	Inhalation(Rat) LC50; >709000 ppm4h <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	

A-GAS R410A	<p>Acute toxicity - Inhalation, LC 0, 4 h, rat, &gt; 52 % v/v air (R125/R32) Irritation - No irritation signs noted during toxicity testing. (R125/R32)</p> <p>Chronic toxicity - Inhalation, after a single exposure, dog, &gt;= 10% v/v air, cardiac sensitization following adrenergic stimulation (Data relative to R125) - Inhalation, after repeated exposure, rat, Target organ: central nervous system, &gt;= 5% v/v air (R32) - No mutagenic, teratogenic effects (R125/R32) - Foetotoxic effect (R32)</p>
PENTAFLUOROETHANE	Cardiac sensitisation threshold limit >245400 mg/m3 Anaesthetic effects threshold limit 490800 mg/m3 * DuPont SDS

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 R410A	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
difluoromethane	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	96h	Fish	10mg/l	2
	LC50	96h	Fish	>81.8mg/l	2
	EC50	72h	Algae or other aquatic plants	>114mg/l	2
	EC50	48h	Crustacea	>97.9mg/l	2
	EC50	96h	Algae or other aquatic plants	142mg/l	2
pentafluoroethane	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	>81.8mg/l	2
	EC50	72h	Algae or other aquatic plants	>114mg/l	2
	EC50	48h	Crustacea	>97.9mg/l	2
	NOEC(ECx)	96h	Fish	10mg/l	2
	EC50	96h	Algae or other aquatic plants	142mg/l	2
<b>Legend:</b>	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				

Mobility - Air, Henrys law constant (H) ca. 150kPa.m<sup>3</sup>/mol Result: considerable volatility Conditions: 20 °C / calculated value (Data relative to R125) - Air, Henrys law constant (H) ca. 19.7kPa.m<sup>3</sup>/mol Result: considerable volatility Conditions: 25 °C / calculated value (R32) - Soil/sediments, adsorption, log KOC from 1.05 - 1.7 Conditions: calculated value (R125/R32) Persistence and degradability Abiotic degradation - Air, indirect photo-oxidation, t<sub>1/2</sub> = 28.2 year(s) Conditions: sensitizer: OH radicals Degradations products: carbon dioxide / fluorhydric acid / trifluoroacetic acid (Data relative to R125) - Air, indirect photo-oxidation, t<sub>1/2</sub> = 4.16 year(s) Conditions: sensitizer: OH radicals Degradations products: carbon dioxide / fluorhydric acid (R32) - Air, photolysis, ODP = 0 Result: no effect on stratospheric ozone Reference value for CFC 11: ODP = 1. (R125/R32) - Air, greenhouse effect, GWP < 0.5> Reference value for CFC 11: GWP = 1. (R125/R32) Biotic degradation - Aerobic, test ready biodegradability/closed bottle, degradation from 4 - 5 %, 28 day(s) Result: non-readily biodegradable (R125/R32) Bioaccumulative potential - Bioconcentration: log Po/w from 0.21 - 1.48 Result: non-bioaccumulable Conditions: measured value (R125/R32)

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

### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
difluoromethane	LOW	LOW
pentafluoroethane	HIGH	HIGH

### Bioaccumulative potential

Ingredient	Bioaccumulation
difluoromethane	LOW (LogKOW = 0.2)
pentafluoroethane	LOW (LogKOW = 1.5472)

### Mobility in soil

Ingredient	Mobility
difluoromethane	LOW (KOC = 23.74)



Ingredient	Mobility
pentafluoroethane	LOW (KOC = 154.4)

## 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>
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## SECTION 14 Transport information

### Labels Required

	
Marine Pollutant	NO

### Land transport (DOT)

UN number	3163				
UN proper shipping name	Liquefied gas, n.o.s. (contains pentafluoroethane and difluoromethane)				
Transport hazard class(es)	<table> <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				
Packing group	Not Applicable				
Environmental hazard	Not Applicable				
Special precautions for user	<table> <tr> <td>Hazard Label</td><td>2.2</td></tr> <tr> <td>Special provisions</td><td>T50</td></tr> </table>	Hazard Label	2.2	Special provisions	T50
Hazard Label	2.2				
Special provisions	T50				

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

UN number	3163														
UN proper shipping name	Liquefied gas, n.o.s. * (contains pentafluoroethane and difluoromethane)														
Transport hazard class(es)	<table> <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														
Packing group	Not Applicable														
Environmental hazard	Not Applicable														
Special precautions for user	<table> <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														
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)

UN number	3163
UN proper shipping name	LIQUEFIED GAS, N.O.S. (contains pentafluoroethane and difluoromethane)

Transport hazard class(es)	IMDG Class	2.2
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-C, S-V
	Special provisions	274 392
	Limited Quantities	120 mL

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

Not Applicable

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

Product name	Group
difluoromethane	Not Available
pentafluoroethane	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
difluoromethane	Not Available
pentafluoroethane	Not Available

SECTION 15 Regulatory information

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

difluoromethane is found on the following regulatory lists	
US AIHA Workplace Environmental Exposure Levels (WEELs)	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US CWA (Clean Water Act) - Toxic Pollutants	US Toxicology Excellence for Risk Assessment (TERA) Workplace Environmental Exposure Levels (WEEL)
US DOE Temporary Emergency Exposure Limits (TEELs)	US TSCA Chemical Substance Inventory - Interim List of Active Substances
pentafluoroethane is found on the following regulatory lists	
US AIHA Workplace Environmental Exposure Levels (WEELs)	US Toxicology Excellence for Risk Assessment (TERA) Workplace Environmental Exposure Levels (WEEL)
US EPA Integrated Risk Information System (IRIS)	US TSCA Chemical Substance Inventory - Interim List of Active Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory	

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories	
Flammable (Gases, Aerosols, Liquids, or Solids)	No
Gas under pressure	Yes
Explosive	No
Self-heating	No
Pyrophoric (Liquid or Solid)	No
Pyrophoric Gas	No
Corrosive to metal	No
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	No
Combustible Dust	No
Carcinogenicity	No
Acute toxicity (any route of exposure)	No

Reproductive toxicity	No
Skin Corrosion or Irritation	No
Respiratory or Skin Sensitization	No
Serious eye damage or eye irritation	No
Specific target organ toxicity (single or repeated exposure)	No
Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	Yes
Hazards Not Otherwise Classified	No

**US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)**

None Reported

**State Regulations****US. California Proposition 65**

None Reported

**National Inventory Status**

National Inventory	Status
Australia - AIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (difluoromethane; pentafluoroethane)
China - IECSC	No (difluoromethane)
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
<b>Legend:</b>	<p>Yes = All CAS declared ingredients are on the inventory</p> <p>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.</p>

**SECTION 16 Other information**

Revision Date	06/08/2019
Initial Date	19/01/2007

**SDS Version Summary**

Version	Date of Update	Sections Updated
8.1	16/03/2017	Acute Health (inhaled), Acute Health (skin), Chronic Health, Classification, Handling Procedure, Ingredients, Storage (suitable container)
9.1	31/01/2019	Acute Health (eye), Acute Health (inhaled), Acute Health (skin), Acute Health (swallowed), Advice to Doctor, Chronic Health, Environmental, Exposure Standard, First Aid (skin), First Aid (swallowed), Handling Procedure, Personal Protection (other), Personal Protection (Respirator), Personal Protection (eye), Personal Protection (hands/feet), Spills (major), Storage (storage incompatibility), Storage (storage requirement), Toxicity and Irritation (Other), Transport Information

**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.

Continued...

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  
AIIIC: 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

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