

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

(\*) onlcy chemical-announcement

(\*\*) to be filled either 3.1 or 3.2

SECTION 1: IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY/UNDERTAKING	
<b>1.1</b>	<b>Product identifier</b>
<b>Product / Trade name</b>	R442A
<b>Chemical name, formula</b>	CH <sub>2</sub> F <sub>2</sub> 31 %; C <sub>2</sub> HF <sub>5</sub> 31 %; C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> 30 %; C <sub>2</sub> H <sub>4</sub> F <sub>2</sub> 3 %; C <sub>3</sub> HF <sub>7</sub> 5 % (% by weight)
<b>Other name</b>	R442A, R32 31 %; R125 31 %; R134a 30 %; R152a 3 %; R227ea 5% (% by weight)
<b>CAS</b>	CH <sub>2</sub> F <sub>2</sub> , Difluoromethane, CAS nr 75-10-5, Reach 01-2119471312-47
<b>REACH-reg.nro</b>	C <sub>2</sub> HF <sub>5</sub> , Pentafluoroethane, CAS nr 354-33-6, Reach 01-2119485636-25 C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> , 1,1,1,2-Tetrafluoroethane, CAS nr 811-97-2, Reach 01-2119459374-33 C <sub>2</sub> H <sub>4</sub> F <sub>2</sub> , 1,1-Difluoroethane, CAS nr 75-37-6, Reach 01-2119474440-43 C <sub>3</sub> HF <sub>7</sub> , 1,1,1,2,3,3,3-Heptafluoropropane CAS nr 431-89-0, Reach 01-2119485489-18
<b>1.2</b>	<b>Relevant identified uses of the substance</b>
<b>Identified uses</b>	Industrial and professional use. Perform risk assessment prior to use. Refrigerant. Filling gas or filler fluid Use of gas alone or in mixtures for the calibration of analytical equipment.
<b>Use advised against</b>	Consumer use.
<b>1.3</b>	<b>Details of the supplier of the safety data sheet</b>
Darment Oy	
<b>VAT</b>	FI09368266
<b>Address</b>	Ruosilantie 18
<b>Postal code and city</b>	FI-00390 HELSINKI
<b>Telephone</b>	+358 20 5588 250
<b>E-mail</b>	info@darment.fi
<b>www-site, www-shop site</b>	darment.fi, kauppa.darment.fi

**Emergency telephone numbers in Finland**

tel. 112

**Emergency tel. your country:** \_\_\_\_\_tes. **0800 147 111**, HUS Poison Information Center (free calls), tel. **09 471 977**, open 24 h/day.

SECTION 2: HAZARDS IDENTIFICATION	
<b>2.1</b>	<b>Classification of the substance or mixture</b>

Classification accordint to Regulation (EU) N:o 1272/2008 as amended.

**Physical Hazards**

Gases under pressure

Liquefied gas

H280: Contains gas under pressure; may explode if heated.

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

## 2.2 Label Elements

<b>GHS Hazard Pictogram(s)</b>    <b>Signal Word: Warning</b>	<b>Hazard Statement(s):</b> H280 Contains gas under pressure; may explode if heated. <b>Precautionary Statements</b> <i>Prevention</i> None <i>Response</i> None <i>Storage</i> P410 + P403 Protect from sunlight. Store in a well-ventilated place. <i>Disposal</i> None <b>Supplemental label information:</b> Asphyxiant in high concentrations.
--	---

## 2.3 Other hazards

Contact with evaporating liquid may cause frostbite or freezing of skin. Vapors are heavier than air and may accumulate in wells and cause asphyxiation.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS			
3.2 Mixtures			
Chemical name, trade name	CAS No, EC-No, REACH Reg. No	Concentration (% by weight)	Classification CLP
Difluoromethane CH <sub>2</sub> F <sub>2</sub> , R32	CAS No 75-10-5 EC No 200-839-4 REACH 01-2119471312-47	31,0 %	Flammable gas category 2; H221 Gas under pressure; Liquefied gas; H280
Pentafluoroethane, C <sub>2</sub> HF <sub>5</sub> , R125	CAS No 354-33-6 EC No 206-557-8 REACH 01-2119485636-25	31,0 %	Gas under pressure; Liquefied gas; H280
1,1,1,2-Tetrafluoroethane, C <sub>2</sub> H <sub>2</sub> F <sub>4</sub> , R134a	CAS No 811-97-2 EC No 212-377-0 REACH 01-2119459374-33	30,0 %	Gas under pressure; Liquefied gas; H280
1,1-Difluoroethane C <sub>2</sub> H <sub>4</sub> F <sub>2</sub> , R152a	CAS No 75-37-6 EC No 200-866-1 REACH 01-2119474440-43	3,0 %	Extremely flammable gas category 1; H220 Gas under pressure; Liquefied gas; H280
C <sub>3</sub> HF <sub>7</sub> , 1,1,1,2,3,3,3-Heptafluoropropane R227ea	CAS nr 431-89-0 EC No 207-079-2 REACH 01-2119485489-18	5,0 %	Gas under pressure; Liquefied gas; H280

All concentrations are nominal. Classification, CLP Regulation No. 1272/2008.

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

## SECTION 4: FIRST AID MEASURES

### 4.1 Description of first aid measures

**Inhalation:** In high concentrations may cause asphyxiation. Symptoms may include loss of mobility or consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor or 112. Apply artificial respiration if breathing stopped.

**Skin contact:** Contact with evaporating liquid may cause frostbite or freezing of skin.

**Eye contact:** Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance.

**Ingestion:** Ingestion is not considered a potential route of exposure. But In case of ingestion, seek medical advice immediately and show the safety data sheet for this product.

### 4.2 Most important symptoms an effects, acute and delayed

May cause cardiac arrhythmia. Inhalation may cause shortness of breath, dizziness, weakness, nausea, headache, narcosis, irregular cardiac activity, asphyxia.

Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

Eye contact may cause severe pain and permanent damage.

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

**Hazards:** Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling,

**Treatment:** Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

## SECTION 5: FIREFIGHTING MEASURES

Heat may cause the containers to explode. Material will not burn.

### 5.1 Extinguishing media

**Extinguishing media:** Material will not burn. In case of fire in the surroundings: use appropriate extinguishing agent. Use water spray to cool containers.

**Unsuitable Extinguishing media:** None.

### 5.2 Special hazards arising from the substance or mixture

Fire or excessive heat may produce hazardous decomposition products.

**Hazardous Combustion Products:** If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition.

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

### 5.3 Advice for firefighters

**Special fire fighting procedures:** In case of fire stop leak if safe to do so. Continue spraying water from protected position until container stays cool. Use extinguishant. Isolate the source of the fire or let it burn out.

Follow the internal emergency plan and general accident and emergency guidelines.

Depending on the intensity of the fire, it may be necessary to wear full protective clothing and self-contained breathing apparatus. Safety equipment and first aid equipment must be available at the minimum level.

**Firefighters** must wear standard protective equipment: a fire-resistant jacket, a helmet with a face shield, gloves and rubber boots even in an enclosed area with an oxygen device.

**Instructions:** EN 469 Protective clothing for firefighters. Requirements and test methods for fire rating. EN 15090 Safety footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in houses and others constructions. Standard EN 137 Compressed air breathing apparatus - Portable open circuit compressed air devices - Requirements, testing, marking.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipments and emergency procedures

Evacuate area. Provide adequate ventilation.

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

Standard EN 137 Respiratory protective devices – Self-contained open-circuit compressed air breathing apparatus with full face mask – Requirements, testing, marking.

### 6.2 Environmental precautions

The product is not classified as dangerous for the environment. Keep away from drains, surface and ground water. Prevent further leakage or spillage if safe to do so.

### 6.3 Methods and material for containment and cleaning up

Provide adequate ventilation.

### 6.4 References to other sections

Refer to sections 8 and 13.

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

## SECTION 7: HANDLING AND STORAGE

### 7.1 Precautions for safe handling

- Only experienced and properly instructed persons should handle gases under pressure.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature.
- Refer to supplier's handling instructions.
- The substance must be handled in accordance with good industrial hygiene and safety procedures.
- Protect containers from physical damage; do not drag, roll, slide or drop.
- Do not remove or deface labels provided by the supplier for the identification of the container contents.
- When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc.
- Secure cylinders in an upright position at all times, close all valves when not in use.
- Provide adequate ventilation.
- Suck back of water into the container must be prevented.
- Do not allow backfeed into the container.
- Avoid suckback of water, acid and alkalis.
- Keep container below 45 °C in a well ventilated place.
- Observe all regulations and local requirements regarding storage of containers.
- When using do not eat, drink or smoke.
- Observe all legal and local requirements for the storage of cylinders / containers.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to repair or modify container valves or safety relief devices.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Keep container valve outlets clean and free from contaminates particularly oil and water.
- If user experiences any difficulty operating container valve discontinue use and contact supplier.
- Never attempt to transfer gases from one container to another.
- Container valve guards or caps should be in place.

### 7.2 Conditions for safe storage including any incompatibilities

- Containers should not be stored in conditions likely to encourage corrosion.
- Stored containers should be periodically checked for general conditions and leakage.
- Container valve guards or caps should be in place.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible material.

### 7.3 Specific end use(s)

None.

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

**SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION**
**8.1 Control parameters**
**Occupational exposure limits**

None of the components have assigned exposure limits.

**DNEL Values**

Critical componene	Type	Value	Remarks
1,1-Difluoroethane	Worker – inhalative, longterm – systemic	1085,98 mg/m <sup>3</sup>	Repeated dose toxicity.
	General population – inhalative, longterm – systemic	270,14 mg/m <sup>3</sup>	Repeated dose toxicity.
Difluoromethane	Worker – inhalation, longterm – systemic	7035 mg/m <sup>3</sup>	Repeated dose toxicity.
	General population – inhalation, longterm – systemic	750 mg/m <sup>3</sup>	Repeated dose toxicity.
1,1,1,2-Tetrafluoroethane	Worker – inhalative, longterm – systemic	13936 mg/m <sup>3</sup>	Repeated dose toxicity.
	General population – inhalative, longterm – systemic	2476 mg/m <sup>3</sup>	Repeated dose toxicity.
Pentafluoroethane	Worker – inhalative, longterm – systemic	16444 mg/m <sup>3</sup>	Repeated dose toxicity.
	General population – inhalative, longterm – systemic	1753 mg/m <sup>3</sup>	Repeated dose toxicity.
1,1,1,2,3,3,3- Heptafluoropropane	Worker – inhalative, longterm – systemic	61279 mg/m <sup>3</sup>	Repeated dose toxicity.
	General population – inhalative, longterm – systemic	65 mg/m <sup>3</sup>	Repeated dose toxicity.

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

### PNEC Values

Critical component	Type	Value	Remarks
1,1-Difluoroethane	Aquatic (freshwater)	48 -168,28 µg/l	-
	Aquatic (intermit.releases)	480 – 1682,76 µg/l	-
	Aquatic (marine water)	4,8 – 16,83 µg/l	-
	Sewage treatment plant	4,726 mg/l	-
	Sediment (freshwater)	190 – 1140,59 µg/kg	-
	Sediment (marine water)	19 – 114,06 µg/kg	-
	Soil	96,01 – 141 µg/kg soil dw	-
Difluoromethane	Aquatic (freshwater)	142 - 313 µg/l	-
	Aquatic (intermit.releases)	1,42 3,13 mg/l	-
	Sediment (freshwater)	534 – 1806,9 µg/kg	-
1,1,1,2-Tetrafluoroethane	Aquatic (freshwater)	100 µg/l	-
	Aquatic (intermit.releases)	1 mg/l	-
	Aquatic (marine water)	10 µg/l	-
	Sewage treatment plant	73 mg/l	-
	Sediment (freshwater)	0,75 mg/kg	-
Pentafluoroethane	Aquatic (freshwater)	100 µg/l	-
	Aquatic (intermit.releases)	1 mg/l	-
	Sediment (freshwater)	600 µg/kg	-
1,1,1,2,3,3,3-Heptafluoropropane	Aquatic (freshwater)	100 µg/l	-
	Aquatic (intermit.releases)	1 mg/l	-
	Sewage treatment plant	1,73 mg/l	-
	Sediment (freshwater)	1,3 mg/kg	-

## 8.2 Exposure controls

### Appropriate engineering controls

- Consider a work permit system e.g. for maintenance activities.
- Ensure adequate ventilation including exhaust ventilation to ensure that the specified exposure limit value is not exceeded.
- Systems under pressure should be regularly checked for leakages.
- Preferably use permanent leak tight connections (eg. welded pipes).
- Do not eat, drink or smoke when using the product.

### Individual protection measures like personal protective equipment

**General information:** A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.

### Eye and face protection

To avoid exposure to liquid splashes, safety glasses, eye protection or face shields should be used in accordance with EN 166.

(Instructions: EN 166 Personal Eye Protection.)

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

**Skin protection****Hand protection:** Wear working gloves while handling containers. (Guidelines: EN 388 Protective gloves against mechanical risks)**Body protection:** No special precautions.**Other:** Wear safety shoes while handling containers.  
Guideline: ISO 20345 Persona protective equipment – safety footwear.**Respiratory protection:** Not required.**Thermal hazards:** No precautionary measures are necessary.**Hygiene measures:** Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.**Environmental exposure controls:** Waste disposal, see sec. 13.**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES****9.1. Information on basic physical and chemical properties**

<b>Appearance, physical state, form and color</b>	Gas, liquefied gas, colorless.
<b>Odor</b>	Odourless / Ethereal
<b>Odor threshold</b>	Subjective and inadequate to warn of over exposure.
<b>pH</b>	Not applicable
<b>Melting point</b>	No data available
<b>Boiling point (°C)</b>	- 46,5
<b>Critical temperature (°C)</b>	No data available
<b>Flash point</b>	Not applicable to gases and gas mixtures.
<b>Evaporation rate</b>	Not applicable to gases and gas mixtures.
<b>Flammability (solid, gas)</b>	This product is not flammable.
<b>Flammability limit upper / lower</b>	Not applicable.
<b>Vapor pressure</b>	1275,7 kPa (25 °C)
<b>Vapor density</b>	2,88 kg/m <sup>3</sup> (15 °C)
<b>Relative density</b>	1,13 (20 °C)
<b>Solubility (ies), 25°C</b>	No data available
<b>Partition coefficient, n-oktanol/water</b>	Not known
<b>Autoignition temperature</b>	Not applicable
<b>Decomposition temperature</b>	Not known
<b>Viscosity, kinematich / dynamic</b>	No data available

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

**Explosive properties**

Not applicable

**Oxidizing properties**

Not applicable

**9.2 Other information**

Gas/vapour is heavier than air. May accumulate in confined spaces, particularly at or below ground level.

**SECTION 10: STABILITY AND REACTIVITY****10.1 Reactivity**

No reactivity hazard other than the effects described in sub-section below.

**10.2 Chemical stability**

Stable under normal conditions.

**10.3 Possibility of hazardous reactions**

None.

**10.4 Conditions to avoid**

Open flames and high energy ignition sources. The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.

**10.5 Incompatible materials**

No reaction with any common materials in dry or wet conditions. Oxidizing agents.  
Chemically-active metals (such as calcium, powdered aluminum, zinc, and magnesium).

**10.6 Hazardous decomposition products**

Under normal conditions of storage and use hazardous decomposition products should not be produced.

**SECTION 11: TOXICOLOGICAL INFORMATION****11.1 Information on toxicological effects**

**General information:** None.

**Acute toxicity / Oral**

Product: Based on the available data, the classification criteria are not met.

**Acute toxicity /Dermal**

Product: Based on the available data, the classification criteria are not met.

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

### Acute toxicity / Inhalation

#### Component information

Difluoromethane:	LC <sub>0</sub> (4 h)	(Rat)	520000 ppm	Remarks: Practically nontoxic
1,1,1,2-Tetrafluoroethane	LC <sub>Lo</sub> (4 h)	(Rat)	567000 ppm	Remarks: Practically nontoxic
Pentafluoroethane	LC <sub>Lo</sub> (4 h)	(Rat)	800000 ppm	Remarks: Practically nontoxic
1,1,1,2,3,3,3-Heptafluoropropane	LC <sub>50</sub> (4 h)	(Rat)	789696 ppm	Remarks: Practically nontoxic

### Repeated dose toxicity

1,1-Difluoroethane:	NOAEC	(Rat)	137,489 – 208,652 mg/l air
	NOAEC	(Rat)	40000 - 50000 ppm
Difluoromethane:	NOAEL	(Rat)	49100 ppm
1,1,1,2-Tetrafluoroethane	NOAEC	(Rat)	50000 ppm
Pentafluoroethane	NOAEL	(Rat)	50000 ppm
1,1,1,2,3,3,3-Heptafluoropropane	NOAEC	(Rat)	731,69 mg/l air

### Skin corrosion / irritation

Product: Based on the available data, the classification criteria are not met.

### Serious eye damage / eye irritation

Product: Based on the available data, the classification criteria are not met.

### Serious eye damage /eye irritation

Product: Based on the available data, the classification criteria are not met.

### Respiratory or skin sensitization

Product: Based on the available data, the classification criteria are not met.

### Germ cell mutagenicity

Product: Based on the available data, the classification criteria are not met.

### Carcinogenicity

Product: Based on the available data, the classification criteria are not met.

### Reproductive toxicity

Product: Based on the available data, the classification criteria are not met.

### Specific target organ toxicity – single exposure

Product: Based on the available data, the classification criteria are not met.

### Specific target organ toxicity – repeated exposure

Product: Based on the available data, the classification criteria are not met.

### Aspiration hazard

Not applicable to gases and gas mixtures.

### Other relevant toxicity information

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

- Light hydrocarbons have been associated with cardiac sensitization in abuse situations.
- Hypoxia or the injection of adrenaline-like substances enhances effects.
- May produce irregular heart beat and nervous symptoms.

**SECTION 12: ECOLOGICAL INFORMATION**
**12.1 Toxicity**

**Acute toxicity, Product** No ecological damage caused by this product.

**Acute toxicity – Fish:**

1,1-Difluoroethane:	LC <sub>50</sub> (4 d):	295,783 – 719,611 mg/l
Difluoromethane:	LC <sub>50</sub> (4 d):	1507 mg/l
1,1,1,2-Tetrafluoroethane	LC <sub>50</sub> (4 d):	450 mg/l
	LC <sub>50</sub> (72 h):	450 mg/l
	LC <sub>50</sub> (48 h):	450 mg/l
	LC <sub>50</sub> (24 h):	560 mg/l
Pentafluoroethane:	LC <sub>50</sub> (4 d):	81,8 mg/l
	LC <sub>50</sub> (72 h):	450 mg/l
	LC <sub>50</sub> (48 h):	450 mg/l
	LC <sub>50</sub> (24 h):	560 mg/l
	LC <sub>0</sub> (4 d):	200 mg/l
1,1,1,2,3,3,3-Heptafluoropropane	LC <sub>50</sub> (4 d):	81,8 - 200 mg/l
	LC <sub>0</sub> (4 d):	200 mg/l
	NOEC (4 d):	10 mg/l

**Acute toxicity – Aquatic invertebrates:**

1,1-Difluoroethane:	EC <sub>50</sub> (48 h):	146,695 mg/l
	LC <sub>50</sub> (48 h):	364,06 mg/l
Difluoromethane:	EC <sub>50</sub> (48 h):	652 mg/l
	LC <sub>50</sub> (48 h):	833 mg/l
1,1,1,2-Tetrafluoroethane	EC <sub>50</sub> (24 h):	960 mg/l
Pentafluoroethane:	EC <sub>50</sub> (48 h):	97,9 mg/l
	EC <sub>50</sub> (24 h):	960 mg/l
	NOEC (48 h)	97,9 mg/l
1,1,1,2,3,3,3-Heptafluoropropane	EC <sub>50</sub> (48 h):	97,9 - 200 mg/l
	NOEC (48 h)	97,9 – 200 mg/l

**Toxicity to Aquatic Plants**

1,1-Difluoroethane:	EC <sub>50</sub> (4 d):	168,276 mg/l
Difluoromethane:	EC <sub>50</sub> (4 d):	142 mg/l
1,1,1,2-Tetrafluoroethane	EC <sub>50</sub> (4 d)	142 mg/l
	EC <sub>50</sub> (72 h)	114 mg/l
	NOEC (72 h)	13,2 mg/l
Pentafluoroethane:	EC <sub>50</sub> (4 d):	142 mg/l
	EC <sub>50</sub> (72 h):	114 mg/l
	NOEC (72 h)	13,2 mg/l
1,1,1,2,3,3,3-Heptafluoropropane	EC <sub>50</sub> (72 h)	114 - 118 mg/l
	NOEC (72 h)	13,2 mg/l

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

**Toxicity to Microorganisms**

1,1,1,2-Tetrafluoroethane	EC <sub>50</sub> (6 h):	730 mg/l
	EC <sub>10</sub> (6 h):	730 mg/l
1,1,1,2,3,3,3-Heptafluoropropane	EC <sub>50</sub> (3 h):	173,1 mg/l

**12.2 Persistence and degradability**

Not applicable to gases and mixtures.

**12.3 Bioaccumulative potential**

No bioaccumulation potential.

**12.4 Mobility in soil**

No data available

**12.5 Results of PBT and vPvB**

Not classified as PBT or vPvB.

**12.6 Other adverse effects****Global Warming Potential: 1888**

Contains fluorinated greenhouse gases When discharged in large quantities may contribute to the greenhouse effect. For GWP value of mixture and quantities, refer to container label.

**Component Information****1,1-Difluoroethane**

EU. F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation 517/2014/EU on FGGs- Global warming potential: 124 Annex 1: Fluorinated greenhouse gases referred to in Point 1 of Article 2; Section 1:Hydrofluorocarbons (HFCs) and its mixtures

**Difluoromethane**

EU. F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation 517/2014/EU on FGGs- Global warming potential: 675 Annex 1: Fluorinated greenhouse gases referred to in Point 1 of Article 2; Section 1:Hydrofluorocarbons (HFCs) and its mixtures

**1,1,1,2-Tetrafluoroethane**

EU. F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation 517/2014/EU on FGGs- Global warming potential: 1430 Annex 1: Fluorinated greenhouse gases referred to in Point 1 of Article 2; Section 1:Hydrofluorocarbons (HFCs) and its mixtures

**Pentafluoroethane**

EU. F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation 517/2014/EU on FGGs- Global warming potential: 3500 Annex 1: Fluorinated greenhouse gases referred to in Point 1 of Article 2; Section 1:Hydrofluorocarbons (HFCs) and its mixtures.

**1,1,1,2,3,3,3-Heptafluoropropane**

EU. F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation 517/2014/EU on FGGs- Global warming potential: 3220 Annex 1: Fluorinated greenhouse gases referred to in Point 1 of Article 2; Section 1:Hydrofluorocarbons (HFCs) and its mixtures

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

Waste type (EU Commission Regulation 1357/2014): Not hazardous. Waste type: Not applicable.

#### General information:

Avoid discharges to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Refer to manufacturer or supplier for information on recovery or recycling.

#### Disposal methods

Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", <http://www.eiga.org>) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state or local laws.

#### European Waste Codes:

Container: 14 06 01\*: chlorofluorocarbons, HCFC, HFC

EU legislation: Directive 2008/98/ETY, 2014/955/EU, EU Commission Regulation nr 1357/2014.

National legislation (FI): Waste Act, 646/2011, 1104/2011, 195/2012, 1178/2013, 25/2014, 410/2014, 528/2014, 1062/2015, 1518/2015, 328/2016, 996/2016, 626/2017, 834/2017, 321/2018, 445/2018, 686/2018, 757/2018, 967/2018, 247/2019, 438/2019, 1421/2019.

## SECTION 14: TRANSPORT INFORMATION

### 14.1 UN Number

#### ADR

14.1 UN Number	UN 1078
14.2 UN Proper Shipping Name	REFRIGERANT GAS N.O.S. (1,1-Difluoroethane, Difluoromethane)
14.3 Transport Hazard Classes	
Class	2
Labels	2.2
Hazard No. (ADR)	20
Tunnel restriction code	(C/E)
14.4 Packing Group	–
14.5 Environmental Hazards	Not applicable
14.6 Special precautions for users	–

#### RID

14.1 UN Number	UN 1078
14.2 UN Proper Shipping Name	REFRIGERANT GAS N.O.S. (1,1-Difluoroethane, Difluoromethane)
14.3 Transport Hazard Classes	
Class	2
Labels	2.2
14.4 Packing Group	–
14.5 Environmental Hazards	Not applicable
14.6 Special precautions for user:	–

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

**IMDG**

14.1 UN Number	UN 1078
14.2 UN Proper Shipping Name	REFRIGERANT GAS N.O.S. (1,1-Difluoroethane, Difluoromethane)
14.3 Transport Hazard Classes	
Class	2.2
Labels	2.2
EmS No.	F-C, S-V
14.3 Packing Group	–
14.5 Environmental Hazards	Not applicable
14.6 Special precautions for user	–

**IATA**

14.1 UN Number	UN 1078
14.2 UN Proper Shipping Name	REFRIGERANT GAS N.O.S. (1,1-Difluoroethane, Difluoromethane)
14.3 Transport Hazard Classes	
Class	2.2
Labels	2.2
14.4 Packing Group	–
Passenger and cargo aircraft:	200
Cargo aircraft only:	200
14.5 Environmental Hazards	Not applicable
14.6 Special precautions for user	–

**14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code**

Not applicable.

**Additional instructions:**

- Avoid transport on vehicles where the load space is not separated from the driver's compartment.
- Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
- Before transporting product containers ensure that they are firmly secured.
- Ensure that the container valve is closed and not leaking.
- Container valve guards or caps should be in place.
- Ensure adequate air ventilation

**SECTION 15: REGULATORY INFORMATION****15.1 Safety, health and environmental regulations / legislation specific for the substance or mixture****EU Regulations**

- Regulation (EC) No 517/2014 on fluorinated greenhouse gases
- Regulation (EC) No 1907/2006 – Annex XVII – Restrictions on manufacture, placing on the market and use of certain dangerous substances, mixtures and articles.
- Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work.

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

- Regulation (EU) 2016/425 on personal protective equipment.
- Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX).
- Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.
- This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

**National regulations:**

- Chemicals Act 599/2013
- Act amending the Chemicals Act 554/2014, 746/2016, 199/2017, 656/2018, 756/2018, 711/2020.
- Classification and Labeling of Chemicals 807/2001: amendment 687/2005, 206/2007, 655/2008,6/2010
- Government Decree on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products 837/2005.
- Government Decree on the limitation of emissions to air from certain activities and Installations using organic solvents 64/2015
- Waste Act, 646/2011, 1104/2011, 195/2012, 1178/2013, 25/2014, 410/2014, 528/2014, 1062/2015, 1518/2015, 328/2016, 996/2016, 626/2017, 834/2017, 321/2018, 445/2018, 686/2018, 757/2018, 967/2018, 247/2019, 438/2019, 1421/2019.

Concentrations known as harmful 268/2014

- Concentrations known as harmful 268/2014

**15.2 Chemical safety assessment**

No Chemical Safety Assessment has been carried out.

**SECTION 16: OTHER INFORMATION**

**Revision information:** -

**Data sources of this SDS**

Safety Data Sheet provided by the manufacturer.

Legislation on hazardous chemicals valid at the time of writing.

European Chemicals Agency, Guidance on the compilation of safety data sheets / REACH Regulation (EU) 1907/2006, ARTICLE 31: Requirements for safety data sheets.

European Chemicals Agency, Information on registered substances.

International Programme on Chemical Safety.

**WWW-SOURCES**

[echa.europa.eu](http://echa.europa.eu)

[eiga.org](http://eiga.org)

[esis.jrc.ec.europa.eu](http://esis.jrc.ec.europa.eu)

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

---

[eur-lex.europa.eu](http://eur-lex.europa.eu)

[atsdr.cc.gov](http://atsdr.cc.gov)

[www.lvm.fi/en/home](http://www.lvm.fi/en/home)

<http://toxnet.nlm.nih.gov/>

<http://www.who.int/ipcs/en/>

[www.ericards.net](http://www.ericards.net)

#### **Rating methods of classification**

Regulation (EU) No 1272/2008 (CLP), Regulation on classification, labeling and packaging of substances and mixtures.

#### **Precautionary, Wording of the H-statements in section 2 and 3**

H221: Flammable gas.

H280: Contains gas under pressure, may explode if heated.

#### **Classification according to Regulation (EC) N:o 1272/2008 as amended**

Flam. Gas 2, H221

Press. Gas Liq. Gas, H280

#### **Training information**

It is recommended that persons handling the product have minimum training in the prevention and protection of work-related hazards. This makes it easier to understand and interpret the safety data sheet and product labels. Users of breathing apparatus must be trained. Ensure all operators understand the flammability hazard.

#### **Other information**

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Ensure equipment is adequately earthed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

#### **Other information**

##### **Disclaimer:**

This information is provided without warranty. The data is trusted to be flawless. This information should be used to make an independent determination of the practices that protect workers and the environment.

The information contained in this MSDS is based on sources, scientific and technical knowledge, existing national and EU legislation.

The release is intended to serve the safe use of the product. We do not know or control the working methods or conditions of the users of the product. The user is always ultimately responsible for taking measures to ensure compliance with the regulations in force in the handling, storage, use and disposal of chemicals.

In this context, it is noted that the information provided in the SDS also helps employers to fulfill their obligations under Directive 98/24 / EU10 on the protection of the health and safety of workers from the risks related to chemical agents at work.

Date of issue: 2021/10/04

Last revised date: 2021/10/04

SAFETY DATA SHEET

Product name / chemical name: R442A / CH<sub>2</sub>F<sub>2</sub> 31 %; C<sub>2</sub>HF<sub>5</sub> 31 %; C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> 30 %; C<sub>2</sub>H<sub>4</sub>F<sub>2</sub> 3 %; C<sub>3</sub>HF<sub>7</sub> 5 % (w/w)

SDS according to setting: EU 2015/830

---

On the basis of the safety data sheet, users should be able to take the necessary measures in the field of health and safety to ensure safety and protect the environment.

---

The Safety Data Sheet is provided for in Article 31 of REACH Regulation (EU) No 1907/2006 and in Annex II to the Regulation.