

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixture
 Name : R-454A
 UFI : Q220-T090-H00A-1EEM
 Product code : 100145700

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

1.2.1. Relevant identified uses

Main use category : Professional use, Consumer use
 Use of the substance/mixture : Refrigerant

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Supplier

Dehon Service SAS
 26 Avenue du Petit Parc
 94683 VINCENNES Cedex - France
 T 01 43 98 75 00 - F 01 43 98 21 51
ContactFDS@climalife.dehon.com

Other

Climalife Kft Budepesta sucursală Bucuresti Romania
 Bulevardul Hristo Botev, Nr. 28,
 Biroul NR 4, Modulul I
 Bucuresti Sectorul 3 - Romania
ContactFDS@climalife.dehon.com

Other

Dehon Kälte-Fachvertriebs GmbH
 Robert-Bosch-Strasse 14
 40668 MEERBUSCH - Germany
 T 00 49 2150 7073 0 - F 00 49 2150 7073 17
ContactFDS@climalife.dehon.com

Other

Dehon Service Belgium s.a./n.v.
 Avenue Carton de Wiart, 79
 1090 Bruxelles - Belgium
 T 00 32 2 421 01 70 - F 00 32 2 426 96 62
ContactFDS@climalife.dehon.com

Other

Friogas sa
 Poligono Industrial SEPES
 Parcela 10
 46500 SAGUNTO (Valencia) - Spain
 T 00 34 9 6 266 36 32 - F 00 34 9 6 266 50 25
ContactFDS@climalife.dehon.com

Other

Prochimac SA
 ZI Petits Champs 15
 CH-1400 Yverdon-les-Bains - Switzerland
 T 00 41 32 727 36 00 - F 00 41 32 727 36 19
ContactFDS@climalife.dehon.com

Other

Climalife Hongrie Kft
 Villányi út 47
 1118 Budaörs - Hungary
 T (36) 23 431 660 - F (36) 23 431 661
ContactFDS@climalife.dehon.com

Other

Climalife Supplied by Inventec Performance Chemicals Italia SRL
 Via del Lavoro, 10/G
 20874 Busnago MB - Italia
 T +39 39-5973480 - F +39 39-5973490
ContactFDS@climalife.dehon.com

Other

Dehon nordic service
 Östra Hamngatan 50B 3tr
 41109 GÖTEBORG - Sweden
 T 00 46 44 21 58 80 - F 00 46 44 21 58 80
ContactFDS@climalife.dehon.com

Other

Dehon Service Nerderland B.V.
 Van Konijnenburgweg 84
 NL-4612 PL Bergen Op Zoom - Netherlands
 T 00 31 164 212 830 - F 00 31 164 212 831
ContactFDS@climalife.dehon.com

Other

IDS Refrigeration Limited
 22 Apex Court, Woodlands, Bradley Stoke
 BS32 4JT Bristol - United Kingdom
 T 00 44 1179 802520 - F 00 44 1179 802521
ContactFDS@climalife.dehon.com

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1.4. Emergency telephone number

Emergency number : +33 (0) 1 72 11 00 03

Country	Organisation/Company	Address	Emergency number	Comment
United Kingdom	National Poisons Information Service (Birmingham Centre) City Hospital	Dudley Road B18 7QH Birmingham	0344 892 0111	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flam. Gas 1B H221

Press. Gas (Liq.) H280

Full text of hazard classes and H-statements : see section 16

Adverse physicochemical, human health and environmental effects

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Contact with the liquid may cause frostbite and serious damage to eyes.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS02

Signal word (CLP) :

Danger

Hazard statements (CLP) :

H221 - Flammable gas.

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

Precautionary statements (CLP) :

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.

No smoking.

P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 - In case of leakage, eliminate all ignition sources.

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

Extra phrases :

Greenhouse fluorinated gas falling within Kyoto Protocol (GWP = 239).

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
2,3,3,3-Tetrafluoroprop-1-ene	CAS-No.: 754-12-1 EC-No.: 468-710-7 REACH-no: 01-0000019665-61	65	Flam. Gas 1B, H221 Press. Gas (Liq.), H280

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Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Difluoromethane	CAS-No.: 75-10-5 EC-No.: 200-839-4 REACH-no: 01-2119471312-47	35	Flam. Gas 1B, H221 Press. Gas (Liq.), H280

Full text of H-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

- First-aid measures after inhalation : Move the affected person away from the contaminated area and into the fresh air. If you feel unwell, seek medical advice.
- First-aid measures after skin contact : In the event of contact with the liquid: treat resulting frostbite as a burn. Rinse with plenty of water. Do not remove clothing (since it may stick to the skin). If skin burns appear, call a doctor immediately.
- First-aid measures after eye contact : Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Consult an eye specialist immediately.
- First-aid measures after ingestion : Not specifically applicable (gas).

4.2. Most important symptoms and effects, both acute and delayed

- Symptoms/effects : CNS depression. Narcosis. Cardiac disorders. Lack of oxygen: risk of death.
- Symptoms/effects after skin contact : Contact with the product may cause cold burns or frostbite.

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

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray, dry chemical powder, alcohol-resistant foam, carbon dioxide (CO₂).
- Unsuitable extinguishing media : Strong water jet.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : Flammable gas. Heating will cause a rise in pressure with a risk of bursting. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Hazardous gas/vapours are formed in the event of decomposition (see section 10).

5.3. Advice for firefighters

- Firefighting instructions : Use water spray or fog for cooling exposed containers.
- Protection during firefighting : Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Do not attempt to take action without suitable protective equipment. Avoid contact with skin and eyes. Do not breathe smoke. Do not smoke. Evacuate personnel to a safe area. Ventilate spillage area. Stop leak without risks if possible.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

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6.2. Environmental precautions

Product evaporates rapidly when in contact with the air. Prevent entry to sewers and public waters.

6.3. Methods and material for containment and cleaning up

Other information : Mechanically ventilate the spillage area.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For disposal of solid materials or residues refer to section 13 : "Disposal considerations".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Pressurised container. Protect from sunlight and do not expose to temperatures exceeding 50°C. Ensure good ventilation of the work station. Do not pierce or burn, even after use. Use non-sparking tools.

Hygiene measures : Do not drink, eat or smoke in the workplace.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container tight closed. Store : in a cool, well-ventilated area. Store in original container.

Incompatible materials : Strong oxidizing agents. Organic peroxides. Pyrophoric liquids. Pyrophoric or self-heating substances.

Packaging materials : Recommended materials Carbon steel.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1. National occupational exposure and biological limit values

2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
EU - Indicative Occupational Exposure Limit (IOEL)	
IOEL TWA [ppm]	500 ppm (recommended)
Difluoromethane (75-10-5)	
EU - Indicative Occupational Exposure Limit (IOEL)	
IOEL TWA	2200 (recommended)
IOEL TWA [ppm]	1000 ppm (recommended)

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

No additional information available

8.1.5. Control banding

No additional information available

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8.2. Exposure controls

8.2.1. Appropriate engineering controls

No additional information available

8.2.2. Personal protection equipment

8.2.2.1. Eye and face protection

Eye protection:

Safety glasses with side shields

8.2.2.2. Skin protection

Skin and body protection:

Majority cotton protective clothing

Hand protection:

Leather protective gloves. Nitrile-rubber protective gloves. VITON gloves

8.2.2.3. Respiratory protection

Respiratory protection:

In the event of insufficient ventilation: Gas mask with filter type AX. In a confined area : Self-contained breathing apparatus

8.2.2.4. Thermal hazards

No additional information available

8.2.3. Environmental exposure controls

No additional information available

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Liquefied gas.
Colour	: Colourless.
Odour	: slightly ethereal.
Odour threshold	: No data available
pH	: Not applicable
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: -48.3 °C
Flash point	: Not applicable
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: Flammable gas.
Vapour pressure	: 15.24 bar (25°C)
Relative vapour density at 20 °C	: 2.83 (25°C)
Relative density	: No data available
Density	: 0.98 g/cm ³ (25°C)
Solubility	: No data available
Partition coefficient n-octanol/water (Log Pow)	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: Not explosive material according to EC criteria.
Oxidising properties	: Non oxidizing material according to EC criteria.
Lower explosive limit (LEL)	: > 8 vol %
Upper explosive limit (UEL)	: < 15 vol %

9.2. Other information

No additional information available

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SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions of use.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

No dangerous polymerization.

10.4. Conditions to avoid

Pressurised container. Protect from sunlight and do not expose to temperatures exceeding 50°C. Container under pressure. Do not drill or burn even after use. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

Strong oxidizing agents. alkali metals. Alkaline earth metals. Metallic powders. Metallic salts.

10.6. Hazardous decomposition products

On combustion or on thermal decomposition (pyrolysis) releases : Carbon oxides (CO, CO₂), Hydrogen fluoride, Fluorinated hydrocarbons.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)

LC50 Inhalation - Rat [ppm]	> 400000 ppm/4h
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Difluoromethane (75-10-5)

LC50 Inhalation - Rat [ppm]	> 520000 ppm/4h
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Skin corrosion/irritation : Not classified
pH: Not applicable
Additional information : Contact with the liquid causes frostbite
Serious eye damage/irritation : Not classified
pH: Not applicable
Additional information : Contact with the liquefied gas may cause severe ocular lesions
Respiratory or skin sensitisation : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
STOT-single exposure : Not classified
STOT-repeated exposure : Not classified

Difluoromethane (75-10-5)

NOAEC (inhalation, rat, gas, 90 days)	50000 ppmv/6h/day
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Aspiration hazard : Not classified

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SECTION 12: Ecological information

12.1. Toxicity

Hazardous to the aquatic environment, short-term (acute) : Not classified

Hazardous to the aquatic environment, long-term (chronic) : Not classified

2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
LC50 - Fish [1]	> 197 mg/l <i>Cyprinus carpio</i> (Common carp)
EC50 - Crustacea [1]	> 83 mg/l (<i>Daphnia magna</i>)
EC50 72h - Algae [1]	> 100 mg/l (<i>scenedesmus capricornutum</i>)

12.2. Persistence and degradability

2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
Persistence and degradability	Not readily biodegradable.

12.3. Bioaccumulative potential

2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
Partition coefficient n-octanol/water (Log Pow)	2.15

Difluoromethane (75-10-5)	
Partition coefficient n-octanol/water (Log Pow)	0.21

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

Component	
2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

12.6. Other adverse effects

Other adverse effects : Ozone depletion factor ODP (R-11=1) = 0. Total global warming potential (GWP) : 675.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Methods of disposal of packaging. Reuse or recycle following decontamination. Destroy at an authorised site.

Additional information : The user's attention is drawn to the possible existence of specific european, national or local regulations regarding disposal. Refer to manufacturer or supplier for information on recovery or recycling.

Ecology - waste materials : Must not be discharged to atmosphere. Refer to manufacturer or supplier for information on recovery or recycling.





SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / RID

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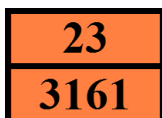
according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

ADR	IMDG	IATA	RID
14.1. UN number			
UN 3161	UN 3161	UN 3161	UN 3161
14.2. UN proper shipping name			
LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane)	LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane)	Liquefied gas, flammable, n.o.s. (2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane)	LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane)
Transport document description			
UN 3161 LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane), 2.1, (B/D)	UN 3161 LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane), 2.1	UN 3161 Liquefied gas, flammable, n.o.s. (2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane), 2.1	UN 3161 LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane), 2.1
14.3. Transport hazard class(es)			
2.1	2.1	2.1	2.1
			
14.4. Packing group			
Not applicable	Not applicable	Not applicable	Not applicable
14.5. Environmental hazards			
Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No	Dangerous for the environment: No
No supplementary information available			

14.6. Special precautions for user

Overland transport

Classification code (ADR) : 2F
Special provisions (ADR) : 274, 662
Limited quantities (ADR) : 0
Tank code (ADR) : PxBN(M)
Transport category (ADR) : 2
Hazard identification number (Kemler No.) : 23
Orange plates :



Tunnel restriction code (ADR) : B/D
EAC code : 2YE

Transport by sea

Special provisions (IMDG) : 274
Limited quantities (IMDG) : 0
EmS-No. (Fire) : F-D
EmS-No. (Spillage) : S-U

Air transport

PCA Limited quantities (IATA) : Forbidden
PCA limited quantity max net quantity (IATA) : Forbidden

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PCA packing instructions (IATA) : Forbidden
PCA max net quantity (IATA) : Forbidden
CAO packing instructions (IATA) : 200
CAO max net quantity (IATA) : 150kg
Special provisions (IATA) : A1, A807

Rail transport

Classification code (RID) : 2F
Special provisions (RID) : 274, 662
Limited quantities (RID) : 0
Tank codes for RID tanks (RID) : PxBN(M)
Transport category (RID) : 2
Colis express (express parcels) (RID) : CE3
Hazard identification number (RID) : 23

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

Contains no REACH substances with Annex XVII restrictions

Contains no substance on the REACH candidate list

Contains no REACH Annex XIV substances

Contains no substance subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.

Contains no substance subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants

15.1.2. National regulations

Ensure all national/local regulations are observed.

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Indication of changes

Section	Changed item	Change	Comments
1.1	REACH registration No	Removed	
1.1	UFI	Added	

Other information : For more information regarding the use of this product, please refer to our technical information or contact the sales department in your region.

Full text of H- and EUH-statements

Flam. Gas 1B	Flammable gases, Category 1B
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
H221	Flammable gas.
H280	Contains gas under pressure; may explode if heated.

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This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.