

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

1.1. Product identifier

Product form : Substance
 Trade name : Solstice® yf (R-1234yf)
 Name : 2,3,3,3-Tetrafluoroprop-1-ene
 EC-No. : 468-710-7
 CAS-No. : 754-12-1
 REACH registration No : 01-0000019665-61
 Product code : 101123500

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

1.2.1. Relevant identified uses

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 SA
 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
 Rue du Château 10
 CH-2000 NEUCHÂTEL - Switzerland
 T 00 41 32 727 36 00 - F 00 41 32 727 36 19
ContactFDS@climalife.dehon.com

Other

Climalife Hongrie Kft
 Rét u. 2
 2040 Budaörs - Hungary
 T 00 36 23 431 660 - F 00 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
 Green Court, Kings Weston Lane
 Avonmouth
 BS11 8AZ Bristol - United Kingdom
 T 00 44 1179 802520 - F 00 44 1179 802521
ContactFDS@climalife.dehon.com

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	

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

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Flam. Gas 1 H220

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) : H220 - Extremely 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.

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name : 2,3,3,3-Tetrafluoroprop-1-ene

CAS-No. : 754-12-1

EC-No. : 468-710-7

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	100	Flam. Gas 1, H220 Press. Gas (Liq.), H280

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

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.

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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 : Extremely 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

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".

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.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Solstice® yf (R-1234yf) (754-12-1)		
Australia	Local name	1,1,1,2-Tetrafluoroethane
Australia	TWA (mg/m ³)	4240 mg/m ³
Australia	TWA (ppm)	1000 ppm
2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)		
EU	IOELV TWA (ppm)	500 ppm (recommended)
Germany	TRGS 900 Occupational exposure limit value (mg/m ³)	950 mg/m ³
Germany	TRGS 900 Occupational exposure limit value (ppm)	200 ppm

2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
DNEL/DMEL (Workers)	
Long-term - systemic effects, inhalation	23000 mg/m ³
PNEC (Water)	
PNEC aqua (freshwater)	> 0,1 mg/l

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2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
PNEC aqua (marine water)	> 0,01 mg/l
PNEC (Sediment)	
PNEC sediment (marine water)	> 0,178 mg/kg dwt
PNEC (Soil)	
PNEC soil	> 1,54 mg/kg dwt

8.2. Exposure controls

Hand protection:

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

Eye protection:

Safety glasses with side shields

Skin and body protection:

Majority cotton protective clothing

Respiratory protection:

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

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Press. Gas (Liq.).
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	: -29,4 °C
Flash point	: Not applicable
Auto-ignition temperature	: 405 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: Extremely flammable gas.
Vapour pressure	: 6,07 bar (21,1°C)
Vapour pressure at 50 °C	: 14,2 bar (54,4°C)
Relative vapour density at 20 °C	: 4
Relative density	: No data available
Density	: 1,1 g/cm ³ (25°C)
Solubility	: Water: 198,2 mg/l (24°C)
Log Pow	: 2,15
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)	: 6,2 vol %
Upper explosive limit (UEL)	: 12,3 vol %

9.2. Other information

No additional information available

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.

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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

React in contact of alkali metals, Light metals. zinc. Magnesium. Strong oxidizing agents.

10.6. Hazardous decomposition products

Hazardous decomposition products may be released during prolonged heating like smokes, carbon monoxide and dioxide. Hydrogen fluoride. Carbonyl halogenides.

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
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
Aspiration hazard	: Not classified

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity : Not classified
Chronic aquatic toxicity : Not classified

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

LC50 fish 1	> 197 mg/l Cyprinus carpio (Common carp)
EC50 Daphnia 1	> 83 mg/l (Daphnia magna)
EC50 72h algae (1)	> 100 mg/l (scenedesmus capricornutum)

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

Solstice® yf (R-1234yf) (754-12-1)

Log Pow : 2,15

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

Log Pow : 2,15

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

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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) : 4.




SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Switzerland : OTD : RS 814.600 / OMoD : RS 814.610.
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 / IATA / IMDG

ADR	IMDG	IATA
14.1. UN number		
3161	3161	3161
14.2. UN proper shipping name		
LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene)	LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene)	Liquefied gas, flammable, n.o.s. (2,3,3,3-Tetrafluoroprop-1-ene)
Transport document description		
UN 3161 LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene), 2.1, (B/D)	UN 3161 LIQUEFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-Tetrafluoroprop-1-ene), 2.1	UN 3161 Liquefied gas, flammable, n.o.s. (2,3,3,3-Tetrafluoroprop-1-ene), 2.1
14.3. Transport hazard class(es)		
2.1	2.1	2.1
		
14.4. Packing group		
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
No supplementary information available		

14.6. Special precautions for user

- Overland transport

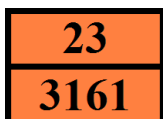
Classification code (ADR) : 2F
Special provisions (ADR) : 274, 662
Limited quantities (ADR) : 0
Excepted quantities (ADR) : E0
Packing instructions (ADR) : P200
Mixed packing provisions (ADR) : MP9
Portable tank and bulk container instructions (ADR) : (M), T50
Tank code (ADR) : PxBN(M)
Tank special provisions (ADR) : TA4, TT9
Vehicle for tank carriage : FL
Transport category (ADR) : 2
Special provisions for carriage - Loading, unloading and handling (ADR) : CV9, CV10, CV36
Special provisions for carriage - Operation (ADR) : S2, S20

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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
Excepted quantities (IMDG) : E0
Packing instructions (IMDG) : P200
Tank instructions (IMDG) : T50
EmS-No. (Fire) : F-D
EmS-No. (Spillage) : S-U
Stowage category (IMDG) : D
Stowage and handling (IMDG) : SW2

- Air transport

PCA Excepted quantities (IATA) : E0
PCA Limited quantities (IATA) : Forbidden
PCA limited quantity max net quantity (IATA) : Forbidden
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
ERG code (IATA) : 10L

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

No REACH Annex XVII restrictions

Solstice® yf (R-1234yf) is not on the REACH Candidate List

Solstice® yf (R-1234yf) is not on the REACH Annex XIV List

15.1.2. National regulations

Ensure all national/local regulations are observed.

Germany

Reference to AwSV : Water hazard class (WGK) 1, low hazard to waters (Classification according to AwSV; ID No. 7910)

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

SZW-lijst van mutagene stoffen : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : The substance is not listed

Switzerland

Swiss National Regulations : ORRChim RS 814.81.

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15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Indication of changes:

Section	Changed item	Change	Comments
13.1	Additional information	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 1	Flammable gases, Category 1
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.

SDS EU (REACH Annex II)

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