

SOLKANE® 134a

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

1.1. Product identifier

- Product name : **SOLKANE® 134a**
- Chemical Name : 1,1,1,2-tetrafluoroethane
- Synonyms : HFA-134a
- Structural formula : CF₃-CH₂F
- REACH Registration Number : 01-2119459374-33
- Type of product : Substance
- CAS-No. : 811-97-2

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

- Identified uses : - Refrigerant
- Foaming agent

1.3. Details of the supplier of the safety data sheet

- Company : SOLVAY FLUOR GmbH
- Address : HANS-BOECKLER-ALLEE 20
D- 30173 HANNOVER
- Telephone : +495118570
- Fax : +495118572146
- E-mail address : manager.sds@solvay.com

1.4. Emergency telephone number

- Emergency telephone number : **+44(0)1235 239 670 [CareChem 24] (Europe)**

SECTION 2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

2.1.1. European regulation (EC) 1272/2008, as amended

Classified as hazardous according to the European regulation (EC) 1272/2008, as amended

Hazard class	Hazard category	Route of exposure	H Phrases
Gases under pressure	Liquefied gas		H280

2.1.2. European Directive 67/548/EEC or 1999/45/EC, as amended

Not classified as hazardous according to European Directive 67/548/EEC or 1999/45/EC, as amended

2.2. Label elements

2.2.1. Signal word

Warning

2.2.2. Hazard pictograms



2.2.3. Hazard statements

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

2.2.4. Precautionary statements

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

2.3. **Other hazards**

- None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

3.1.1. Concentration

Substance name:	Concentration
1,1,1,2 Tetrafluoroethane	>= 99.5 %
CAS-No.: 811-97-2 / EC-No.: 212-377-0 / Index-No.: - REACH Registration Number: 01-2119459374-33	

SECTION 4. FIRST AID MEASURES

4.1. Description of first aid measures

4.1.1. If inhaled

- Remove to fresh air.
- Oxygen or artificial respiration if needed.
- If symptoms persist, call a physician.

4.1.2. In case of eye contact

- Allow to evaporate.
- Rinse thoroughly with plenty of water, also under the eyelids.
- If eye irritation persists, consult a specialist.

4.1.3. In case of skin contact

- Allow to evaporate.
- Wash off with warm water.
- If symptoms persist, call a physician.

4.1.4. If swallowed

- not applicable

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

4.2.1. Inhalation

- In case of higher concentrations: narcosis, Asphyxia, May cause cardiac arrhythmia.

4.2.2. Skin contact

- Contact with liquid or refrigerated gas can cause cold burns and frostbite.
- Prolonged skin contact may defat the skin and produce dermatitis.

4.2.3. Eye contact

- Causes frostbite burns to eyes.
- Symptoms: Lachrymation, Redness, Swelling of tissue, Frostbite, Burn

4.2.4. Ingestion

- gas
- not applicable

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

- Immediate medical attention is not required.
- When symptoms persist or in all cases of doubt seek medical advice.

SECTION 5. FIREFIGHTING MEASURES

5.1. Extinguishing media

5.1.1. Suitable extinguishing media

- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.1.2. Unsuitable extinguishing media

- None.

5.2. Special hazards arising from the substance or mixture

- The product is not flammable.
- Hazardous decomposition products formed under fire conditions.

5.3. Advice for firefighters

- Wear self-contained breathing apparatus and protective suit.
- Wear chemical resistant oversuit
- Special protective actions for fire-fighters
- In case of fire, use water spray.
- Keep product and empty container away from heat and sources of ignition.
- Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. Advice for non-emergency personnel

- Prevent further leakage or spillage if safe to do so.
- Keep away from Incompatible products.

6.1.2. Advice for emergency responders

- Immediately evacuate personnel to safe areas.
- Keep people away from and upwind of spill/leak.
- Wear self-contained breathing apparatus and protective suit.
- Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
- Suppress (knock down) gases/vapours/mists with a water spray jet.
- Avoid spraying the leak source.
- Ventilate the area.

6.2. Environmental precautions

- Discharge into the environment must be avoided.
- Inform the responsible authorities in case of gas leakage, or of entry into waterways, soil or drains.

6.3. Methods and materials for containment and cleaning up

- Allow to evaporate.
- Prevent product from entering drains.

6.4. Reference to other sections

- Refer to protective measures listed in sections 7 and 8.

SECTION 7. HANDLING AND STORAGE

7.1. Precautions for safe handling

- Use only in well-ventilated areas.
- Use only clean and dry utensils.
- Keep away from water.
- Preferably transfer by pump or gravity.
- Keep away from Incompatible products.

7.2. Conditions for storage, including incompatibilities

7.2.1. Storage

- Keep only in the original container.
- Store in a receptacle equipped with a vent.
- Keep containers tightly closed in a cool, well-ventilated place.
- Keep in properly labelled containers.
- Keep in a banded area.
- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Keep away from Incompatible products.

7.2.2. Packaging material

7.2.2.1. *Suitable material*

- Steel drum

7.3. Specific end use(s)

- For further information, please contact: Supplier

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

8.1.1. Exposure Limit Values

1,1,1,2 Tetrafluoroethane

- SAEL (Solvay Acceptable Exposure Limit) 2005
TWA = 1,000 ppm
- UK. EH40 Workplace Exposure Limits (WELs) 12 2011
time weighted average = 1,000 ppm
time weighted average = 4,240 mg/m³

8.1.2. Other information on limit values

8.1.2.1. *Predicted No Effect Concentration*

1,1,1,2 Tetrafluoroethane

- Fresh water, 0.1 mg/l
- Marine water, 0.01 mg/l
- Fresh water sediment, 0.75 mg/kg
- Sewage treatment plants, 73 mg/l
- Intermittent use/release, 1 mg/l

8.1.2.2. *Derived No Effect Level / Derived minimal effect level*

1,1,1,2 Tetrafluoroethane

- Workers, Inhalation, Long-term exposure, 13936 mg/m³, Systemic effects
- Consumers, Inhalation, Long-term exposure, 2476 mg/m³, Systemic effects

8.2. Exposure controls

8.2.1. Appropriate engineering controls

- Ensure adequate ventilation.

- Apply technical measures to comply with the occupational exposure limits.

8.2.2. Individual protection measures

8.2.2.1. *Respiratory protection*

- Self-contained breathing apparatus (EN 133)
- Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions.
- Use only respiratory protection that conforms to international/ national standards.

8.2.2.2. *Hand protection*

- Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
- Protective gloves
- Suitable material: Fluoroelastomer

8.2.2.3. *Eye protection*

- Tightly fitting safety goggles

8.2.2.4. *Skin and body protection*

- Wear suitable protective clothing.

8.2.2.5. *Hygiene measures*

- Eye wash bottles or eye wash stations in compliance with applicable standards.
- When using, do not eat, drink or smoke.
- Gloves, overalls and boots have to be double layered (protection against cold temperature).
- Handle in accordance with good industrial hygiene and safety practice.

8.2.3. Environmental exposure controls

- Dispose of rinse water in accordance with local and national regulations.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

9.1.1. General Information

■ Appearance	Liquefied gas
■ Colour	colourless
■ Odour	ether-like
■ Molecular weight	102 g/mol

9.1.2. Important health safety and environmental information

■ pH	neutral
■ pKa	not applicable
■ Melting point/freezing point	-108 °C
■ Boiling point/boiling range	-26 °C, Pressure: 1,013 hPa
■ Flash point	not applicable
■ Evaporation rate	No data
■ Flammability (solid, gas)	The product is not flammable.
■ Flammability	not applicable
■ Explosive properties	See section 10.
■ Vapour pressure	574 kPa, at 20 °C
■ Vapour density	4.32, at 20 °C
■ Relative density	4.24, at 20 °C
■ Bulk density	No data

▪ Solubility(ies)	1 g/l, at 25 °C, Water
▪ Solubility/qualitative	No data
▪ Partition coefficient: n-octanol/water	log Pow: 1.06, 25 °C
▪ Auto-ignition temperature	> 743 °C
▪ Decomposition temperature	No data available
▪ Viscosity	not applicable
▪ Oxidizing properties	Not expected

9.2. Other information

Remarks No data available

SECTION 10. STABILITY AND REACTIVITY

10.1. Reactivity

- Risk of violent reaction.

10.2. Chemical stability

- Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

- Strong oxidizers, alkali metals and alkaline earth metals may cause fires or explosions.

10.4. Conditions to avoid

- Heat.

10.5. Incompatible materials

- Light and/or alkaline metals, Powdered metals, Alkaline earth metals, Oxidizing agents

10.6. Hazardous decomposition products

- Gaseous hydrogen fluoride (HF), Fluorophosgene
- The release of other hazardous decomposition products is possible.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1. Acute toxicity

11.1.1. Acute oral toxicity

- not applicable

11.1.2. Acute inhalation toxicity

- LC50, 4 h, rat , 2,080,000 mg/m³

11.1.3. Acute dermal toxicity

- Not relevant

11.2. Skin corrosion/irritation

- not applicable

11.3. Serious eye damage/eye irritation

- not applicable,

11.4. Respiratory or skin sensitisation

- not applicable

11.5. Germ cell mutagenicity

- In vitro tests did not show mutagenic effects
- In vivo tests did not show mutagenic effects

11.6. Carcinogenicity

- negative

11.7. Reproductive toxicity

- Inhalation, rat, 208,000 mg/m³, NOAEC
- rat, Developmental Toxicity, no observed effect

11.8. Specific target organ toxicity - single exposure

- Remarks: No data available

11.9. Specific target organ toxicity - repeated exposure

- Inhalation, Human experience, Remarks: no observed effect
- Inhalation, rats, 50000 ppm, Remarks: NOAEL

11.10. Aspiration hazard

- No data available

SECTION 12. ECOLOGICAL INFORMATION

12.1. Toxicity

- Fishes, *Salmo gairdneri*, LC50, 96 h, 450 mg/l, fresh water
- Crustaceans, *Daphnia magna*, EC50, 48 h, 980 mg/l, fresh water
- Algae, *Selenastrum capricornutum*, EC50, 72 h, > 118 mg/l, fresh water (1,1,1,3,3-pentafluorobutane)

12.2. Persistence and degradability

12.2.1. Abiotic degradation

- Air, indirect photo-oxidation
Conditions: sensitizer: OH radicals
Degradation products: Carbon dioxide (CO₂) / hydrofluoric acid
- Water
Result: non-significant hydrolysis

12.2.2. Biodegradation

- aerobic, Tested according to: Closed Bottle test, Chemical degradation, ca. 3 % after 28 d
Result: Not readily biodegradable.

12.3. Bioaccumulative potential

- log Pow 1.06,
Result: Does not bioaccumulate.

12.4. Mobility in soil

- Soil/sediments, log KOC:1.57
Conditions: calculated value
adsorption
- Air
not applicable
- Water
Solubility(ies), Mobility
- Air, Henry's law constant (H), 102 hPa.m³/mol, 25 °C
Conditions: calculated value
considerable volatility

12.5. Results of PBT and vPvB assessment

- This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).
- This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

12.6. Other adverse effects

- Ozone Depletion Potential :
= 0
Result: no effect on stratospheric ozone
Ozone depletion potential; ODP; (R-11 = 1)
- Global Warming Potential :
= 0.25
Halocarbon global warming potential; HGWP; (R-11 = 1)

SECTION 13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

- In accordance with local and national regulations.
- Refer to manufacturer/supplier for information on recovery/recycling.

13.2. Contaminated packaging

- To avoid treatments, as far as possible, use dedicated containers.
- Where possible recycling is preferred to disposal or incineration.

SECTION 14. TRANSPORT INFORMATION

International transport regulations

- IATA-DGR

- | | |
|------------------------------------|-------------------------------------|
| 14.1. UN number | UN 3159 |
| 14.2. UN proper shipping name | 1,1,1,2-TETRAFLUOROETHANE |
| 14.3. Transport hazard class(es) | |
| Hazard class | 2.2 |
| Labels | 2.2 - Non-flammable, non toxic gas, |
| 14.4. Packing group | |
| 14.5. Environmental hazards | |
| 14.6. Special precautions for user | |

- IMDG

- | | |
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| 14.6. Special precautions for user | |
| EmS | F-C
S-V |

- ADR

- | | |
|-------------------------------|---------------------------|
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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

SOLKANE® 134a

Revision Date 26.06.2014

14.3. Transport hazard class(es)

Hazard class 2
Labels 2.2 - Non-flammable, non toxic gas,

14.4. Packing group

14.5. Environmental hazards

14.6. Special precautions for user

HI/UN No. 20 / 3159
Tunnel restriction code C/E

- RID

14.1. UN number UN 3159
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14.3. Transport hazard class(es)

Hazard class 2
Labels 2.2 - Non-flammable, non toxic gas,

14.4. Packing group

14.5. Environmental hazards

14.6. Special precautions for user

HI/UN No. 20 / 3159

- ADN

14.1. UN number UN 3159
14.2. UN proper shipping name 1,1,1,2-TETRAFLUOROETHANE

14.3. Transport hazard class(es)

Hazard class 2
Labels 2.2 - Non-flammable, non toxic gas,

14.4. Packing group

14.5. Environmental hazards

14.6. Special precautions for user

SECTION 15. REGULATORY INFORMATION

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

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), as amended
- Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances, as amended
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, as amended
- REGULATION (EC) No 166/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste
- EH40/2005. Workplace Exposure Limits, as amended through 1,10, 2007 (WELs) Published by the Health and Safety Executive (HSE). Issued under the Control of Substances Hazardous to Health Regulations - as amended

15.1.1. Notification status

Inventory Information	Status
Australia. Inventory of Chemical Substances (AICS)	- In compliance with inventory
Canada. Domestic Substances List (DSL)	- In compliance with inventory
China. Inventory of Existing Chemical Substances (IECSC)	- In compliance with inventory
Japan. Inventory of Existing & New Chemical Substances (ENCS)	- In compliance with inventory
New Zealand. Inventory of Chemicals (NZIOC)	- In compliance with inventory
USA. Toxic Substances Control Act (TSCA)	- In compliance with inventory
EU list of existing chemical substances (EINECS)	- In compliance with inventory
Korea. Existing Chemicals Inventory (KECI (KR))	- In compliance with inventory
Philippine. Inventory of Chemicals and Chemical Substances (PICCS)	- In compliance with inventory
Mexico INSQ (INSQ)	- In compliance with inventory

15.2. Chemical Safety Assessment

- none

SECTION 16. OTHER INFORMATION

16.1. Other information

- Update
This data sheet contains changes from the previous version in section(s): 1.3, 8.1.2, 15.1.1

This SDS is only intended for the indicated country to which it is applicable. The European SDS format compliant with the applicable European legislation is not intended for use nor distribution in countries outside the European Union with the exception of Norway and Switzerland. Safety datasheets applicable in other countries/regions are available upon request.

The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product which conforms to the specification, unless otherwise stated. In this case of combinations and mixtures one must make sure that no new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and protection of human welfare and the environment.

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