

! SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Name of product	R 134a Art-Nr(n): 0046 + 0015
Name of substance	1,1,1,2-Tetrafluoroethane (R 134a)
EC No	212-377-0
REACH registration number	01-2119459374-33
CAS No	811-97-2

1.2. Relevant identified uses of the substance or mixture and uses advised against**Identified uses****Sector of uses [SU]**

SU10 - Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
SU12 - Manufacture of plastics products, including compounding and conversion
SU17 - General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
SU19 - Building and construction work
SU20 - Health services
SU22 - Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites

! Product categories [PC]

PC16 - Heat transfer fluids
PC21 - Laboratory chemicals
PC0 - Other products: propellant (UCN D 15100)
PC0 - Other products: Propellant (plastic foam)
PC0 - Refrigerant

! Remark

Restricted to professional users.

Recommended intended purpose(s)

Refrigerant.
Laboratory reagent.
Aerosol propellant.
Heat transfer fluid.
Propellant (plastic foam).

1.3. Details of the supplier of the safety data sheet**Manufacturer/distributor**

S. Zukausko str. 11, Ramuciai, Kaunas district,
LT - 54464, Lithuania
Phone + 370 37 373248
Fax. + 370 37 373198
E-mail: info@brgroup.eu
www.brgroup.eu

**1.4. Emergency telephone number
Emergency advice**

The Poison Information Bureau
Siltnamiu str. 29, LT-2043 Vilnius
Phone +370 5 2362052;
Fax. +370 5 236 21 42,
E-mail.: info@tox.lt

SECTION 2: Hazards identification**2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]**

Hazard classes and Hazard categories	Hazard Statements Classification procedure
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Liquef. Gas	H280
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! Hazard statements for physical hazards

H280 Contains gas under pressure; may explode if heated.

2.2. Label elements**Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]**

GHS04

! Signal word

Warning

! Hazard statements for physical hazards

H280 Contains gas under pressure; may explode if heated.

Precautionary Statements**! Storage**

P403 Store in a well-ventilated place.

Hazardous ingredients for labeling

1,1,1,2-Tetrafluoroethane (R 134a)

Supplemental Hazard information (EU)**! Health properties**

Asphyxiant in high concentrations.

! Environmental properties

Contains fluorinated greenhouse gases.

2.3. Other hazards**Adverse human health effects and symptoms**

Contact with liquid may cause cold burns/frostbite.

The inhalation of gas / vapour in high concentrations may cause cardiac arrhythmia.

Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.

! Information pertaining to special dangers for human and environment

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

Receptacle under pressure.

Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

! SECTION 3: Composition/ information on ingredients**3.1. Substances****! Description**

Content: > 99 %

CAS No 811-97-2

1,1,1,2-Tetrafluoroethane (R 134a)

EC No 212-377-0

REACH registration number 01-2119459374-33

3.2. Mixtures

not applicable

! SECTION 4: First aid measures**4.1. Description of first aid measures****! General information**

Remove contaminated soaked clothing immediately.

In the event of persistent symptoms receive medical treatment.

Adhere to personal protective measures when giving first aid.

In case of inhalation

Remove the casualty into fresh air and keep him immobile.

Seek medical treatment immediately.

In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Send for a doctor.

! In case of skin contact

In case of contact with skin wash off with warm water.

In case of frostbite rinse with plenty of water. Don't remove clothing.

In case of frostbite spray with lukewarm (not hot) water for at least 15 minutes. Do not remove clothing frozen to the skin. Thaw it with lukewarm water. Apply a sterile dressing. Obtain medical assistance.

Seek medical treatment immediately.

In case of eye contact

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Call for a doctor immediately.

In case of ingestion

Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed**Physician's information / possible symptoms**

The following symptoms may occur in case of strong exposition:

Unconsciousness

Cardiac arrhythmia (disordered cardiac rhythm).

Anaesthetic state

Headache

Nausea

Confusion

Dizziness

Contact with liquid may cause cold burns/frostbite.

Physician's information / possible dangers

Long-term inhaling of separation products may cause pulmonary oedema.

In case of strong exposition risk of cardiac rhythm disturbances.

4.3. Indication of any immediate medical attention and special treatment needed**Treatment (Advice to doctor)**

Symtomatical treatment and give antidote.

Do not give any preparations of the adrenalin-ephedrine group.

! SECTION 5: Firefighting measures**5.1. Extinguishing media****Suitable extinguishing media**

Product does not burn, fire-extinguishing activities according to surrounding.

Alcohol-resistant foam

Dry fire-extinguishing substance

Carbon dioxide

Water spray jet

Unsuitable extinguishing media

Full water jet

5.2. Special hazards arising from the substance or mixture

In case of fire formation of dangerous gases possible.

Carbon monoxide (CO)

Hydrogen fluoride (HF)

Carbonyl fluoride.

5.3. Advice for firefighters**Special protective equipment for fire-fighters**

Use breathing apparatus with independent air supply (isolated).

Wear full protective clothing.

! Additional information

Cool endangered containers with water spray jet.

Exposure to fire may cause containers to rupture / explode.

Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

! SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures****! For non-emergency personnel**

Evacuate area.

Keep people away and stay on the upwind side.

! For emergency responders

Remove persons to safety.

Personal protection by wearing close-fitting protective clothing and breathing apparatus.

6.2. Environmental precautions

If possible, stop flow of product.

Do not discharge into the drains/surface waters/groundwater.

Prevent spread over a wide area (e.g. by containment or oil barriers).

If necessary, secure leaky pressure receptacles in a salvage packaging.

Do not discharge into the subsoil/soil.

6.3. Methods and material for containment and cleaning up

Ensure adequate air ventilation.

Allow to vaporise.

6.4. Reference to other sections

Safe handling: see section 7

Disposal: see section 13

Personal protection equipment: see section 8

! SECTION 7: Handling and storage**7.1. Precautions for safe handling****! Advice on safe handling**

- Use only in thoroughly ventilated areas.
- Transfer and handle only in enclosed systems.
- Containers' temperature may not be increased above 50 °C.
- Do not heat with open flames.
- The working pressure in the receptacle must not exceed the saturation vapour pressure of the pure product resulting at a temperature of 50 °C.
- Provide good room ventilation even at ground level (vapours are heavier than air).
- Prevent cylinders from falling over.
- Avoid release to the environment.
- Ensure valve protection device is correctly fitted.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Open valve slowly to avoid pressure shock.
- Do not allow backfeed into the container.
- Suck back of water into the container must be prevented.
- No water to valves, flanges and other fittings.
- Purging of pipes and valves with inert gases - to avoid: water, solvents.

General protective measures

- Do not inhale gases/vapours/aerosols.

Hygiene measures

- At work do not eat, drink and smoke.
- Wash hands before breaks and after work.

! Advice on protection against fire and explosion

- The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air, oxygen or other oxidants, it may become flammable.
- Pay attention to general rules of internal fire prevention.

7.2. Conditions for safe storage, including any incompatibilities**! Requirements for storage rooms and vessels**

- Keep in closed original container.
- Ventilate store-rooms thoroughly.
- Only use containers that are approved specifically for the substance/product.
- Suitable materials: Normalised carbon steel, tempered alloy steel, aluminium alloys, austenitic stainless steels.
- Valve: Suitable materials: Brass, copper alloys, carbon steels, aluminium alloys, austenitic stainless steels.
- Other material details see ISO 11114.
- All regulations and local requirements for the storage of containers have to be respected.

! Advice on storage compatibility

- Do not store with spontaneously flammable materials.
- Do not store together with combustible liquids or combustible solids.
- Do not store together with animal feedstuffs.
- Do not store together with explosives.
- Do not store together with infectious substances.
- Do not store together with radioactive material.
- Do not store together with toxic liquids or toxic solids.
- Do not store together with food.
- Do not store together with oxidizing liquids or oxidizing solids.

! Further information on storage conditions

- Store closed container at cool and aired place.
- Store only in original container at temperature of 50°C maximum (=122°F).
- Prevent cylinders from falling over.
- Protect of heat.

7.3. Specific end use(s)**! Recommendation(s) for intended use**

Use in accordance with regulation (EU) No 517/2014 on fluorinated greenhouse gases.

! SECTION 8: Exposure controls/personal protection**8.1. Control parameters****! Ingredients with occupational exposure limits to be monitored**

CAS No	Name	Code	[mg/m3]	[ppm]	Remark
811-97-2	1,1,1,2-Tetrafluoroethane (HFC 134a)	WEL, 8 hours	4240	1000	EH40, United Kingdom

DNEL-/PNEC-values**DNEL worker**

CAS No	Substance name	Value	Code	Remark
811-97-2	1,1,1,2-Tetrafluoroethane (R 134a)	13936 mg/m3	DNEL long-term inhalative (systemic)	Assessment factor 7,5

DNEL Consumer

CAS No	Substance name	Value	Code	Remark
811-97-2	1,1,1,2-Tetrafluoroethane (R 134a)	2476 mg/m3	DNEL long-term inhalative (systemic)	Assessment factor 15

PNEC

CAS No	Substance name	Value	Code	Remark
811-97-2	1,1,1,2-Tetrafluoroethane (R 134a)	0,75 mg/kg dw	PNEC sediment, freshwater	Extrapolation
		73 mg/l	PNEC sewage treatment plant (STP)	Assessment factor 10, Extrapolation
		1 mg/l	PNEC aquatic, intermittent release	Assessment factor 100, Extrapolation
		0,01 mg/l	PNEC aquatic, marine water	Assessment factor 10000, Extrapolation
		0,1 mg/l	PNEC aquatic, freshwater	Assessment factor 1000, Extrapolation

8.2. Exposure controls**Respiratory protection**

Breathing apparatus in the event of high concentrations.

Keep self contained breathing apparatus readily available for emergency use.

Do not use any filter apparatus.

Respiratory protection complying with EN 137.

In case of rescue and maintenance activities in storage containers use environment-independent breathing apparatus because of risk of suffocation by edging out of air oxygen

Hand protection

Leather gloves

Protective gloves complying with EN 374.

! Eye protection

Protective goggles according to EN 166, in case of increased risk add protective face shield.

! Other protection measures

Safety shoes with steel toe.

Body covering work clothing, or chemical resistant suit at increased risk.

Appropriate engineering controls

Transfer and handle only in enclosed systems.

! SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties****Appearance**

Gaseous / liquefied under pressure.

Colour

colourless

Odour

ethereal

Odour threshold

not determined

Important health, safety and environmental information

	Value	Temperature	at	Method	Remark
pH value	not applicable				
boiling point	-26 °C		1013 hPa		
melting point	-108 °C				
Flash point	no				
Vapourisation rate	not determined				
Flammable (solid)	not applicable				
Flammability (gas)	no				The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air, oxygen or other oxidants, it may become flammable.
Ignition temperature	not determined				
Self ignition temperature	> 743 °C				

	Value	Temperature	at	Method	Remark
Lower explosion limit	no				
Upper explosion limit	no				
Vapour pressure	5740 hPa	20 °C			
Relative density	1,21 g/cm ³	25 °C			liquid phase
Vapour density	3,59	20 °C			air = 1
Solubility in water	1 g/l	25 °C			
Solubility/other	not determined				
Partition coefficient n-octanol/water (log P O/W)	1,06	25 °C		OECD 107	
Decomposition temperature	> 370 °C				
Viscosity dynamic	not applicable				

Oxidising properties
no

Explosive properties
no

9.2. Other information
Vapours are heavier than air.

! SECTION 10: Stability and reactivity

10.1. Reactivity
See section "Possibility of hazardous reactions".

10.2. Chemical stability
Stable under recommended conditions of use and storage (see section 7).

10.3. Possibility of hazardous reactions
May react violently with oxidants.
When pressurised with air, oxygen or other oxidants, the substance may become flammable.
Reactions with alkali metals.
Reactions with earth alkali metals.
Reactions with metals in powder form.
Reactions with metal salts in powder form.
Reactions with alkalies.

10.4. Conditions to avoid
Heat sources / heat - risk of bursting.
Avoid contact with open flames, glowing metal surfaces, etc..

10.5. Incompatible materials**! Substances to avoid**

Alkali (lye)
Metals in powder form.
Metallic salts in powder form.
Strong oxidizing agents.
Alkali metals.
Earth alkali metals.

10.6. Hazardous decomposition products

Carbon monoxide
Fluorophosgene on contact open flame or glowing objects
Hydrogen fluoride
Carbonyl fluoride

Thermal decomposition

Remark No decomposition if used as directed.

! SECTION 11: Toxicological information**11.1. Information on toxicological effects****Acute toxicity/Irritation/Sensitization**

	Value/Validation	Species	Method	Remark
LD50 acute oral	Study technically not feasible.			
LD50 acute dermal	Study technically not feasible.			
LC50 acute inhalation	567000 ppm (4 h)	rat	OECD 403	
Skin irritation	low irritant effect - not necessary to label	rabbit		
Eye irritation	low irritant - no labeling duty	rabbit eye		
Skin sensitization	non-sensitizing	Laboratory animals		
Sensitization respiratory system	non-sensitizing	Laboratory animals		

Subacute Toxicity - Carcinogenicity

	Value	Species	Method	Validation
Subchronic Toxicity	NOAEL 50000 ppm Inhalation	Rat		No effects of toxicological significance.

	Value	Species	Method	Validation
Mutagenicity			OECD 471 / 473 /474	No experimental information on genotoxicity in vitro and in vivo available.
Reproduction-Toxicity	NOAEL 50000 ppm Inhalation.	Rat	OECD 414	No indications of toxic effects were observed in reproduction studies in animals.
Carcinogenicity	NOAEL 10000 ppm (2 a) Inhalation.	Rat		No indications of carcinogenic effects are available from long-term trials.

! Specific target organ toxicity (single exposure)

Substance or mixture is not classified in GHS-criteria as specific target organ toxic with single exposure.

! Specific target organ toxicity (repeated exposure)

Substance or mixture is not classified in GHS-criteria as specific target organ toxic with repeated exposure.

Aspiration hazard

not applicable

Experiences made from practice

Inhalation causes disordered cardiac rhythm.

Inhalation causes shortness of breath.

Gases have a suffocating effect.

Inhalation causes narcotic effect/intoxication.

! SECTION 12: Ecological information

12.1. Toxicity

Ecotoxicological effects

	Value	Species	Method	Validation
Fish	LC50 450 mg/l (96 h)	Oncorhynchus mykiss		
Daphnia	EC50 980 mg/l (48 h)	Daphnia magna		
Algae	EC50 > 114 mg/l (72 h)	Pseudokirchneriella subcapitata	OECD 201	The product has not been tested. The information was derived from products of similar structure or composition.
Bacteria	EC10 > 730 mg/l (6 h)	growth of Ps. putida		

12.2. Persistence and degradability

	Elimination rate	Method of analysis	Method	Validation
Physico-chemical degradability				At normal temperature very highly volatile or gaseous product that can be released to atmosphere. Elimination test cannot be employed.

	Elimination rate	Method of analysis	Method	Validation
Biological degradability	3 % (28 d)		OECD 301 D	not readily degradable

12.3. Bioaccumulative potential

Does not bioaccumulate.

Because of the n-octanol/water distribution coefficient (log K_{ow}) accumulation in organisms is not expected.

12.4. Mobility in soil

Adsorption in the soil is not likely.

K_{oc}: 37,26

12.5. Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6. Other adverse effects

GWP: 1430

ODP: 0

! General regulation

Use in accordance with regulation (EU) No 517/2014 on fluorinated greenhouse gases.

Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste code No.

14 06 01*

Name of waste

chlorofluorocarbons, HCFC, HFC

Wastes marked with an asterisk are considered to be hazardous waste pursuant to Directive 2008/98/EC on hazardous waste.

Recommendations for the product

Dispose of as hazardous waste.

Return to manufacturer.

Recommendations for packaging

Transportable pressure equipment (empty, residual pressure): Return to supplier / manufacturer.

General information

Operators of stationary equipment shall be responsible for putting in place arrangements for the proper recovery.

SECTION 14: Transport information

	ADR/RID	IMDG	IATA-DGR
14.1. UN number	3159	3159	3159
14.2. UN proper shipping name	REFRIGERANT GAS R 134a (1,1,1,2-TETRAFLUORETHAN)	REFRIGERANT GAS R 134a (1,1,1,2-TETRAFLUROETHANE)	Refrigerant gas R 134a (1,1,1,2-TETRAFLUROETHANE)
14.3. Transport hazard class(es)	2.2	2.2	2.2
14.4. Packing group	-	-	-

	ADR/RID	IMDG	IATA-DGR
14.5. Environmental hazards	No	No	No

14.6. Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

not applicable

No transport as bulk according IBC - Code.

Land and inland navigation transport ADR/RID

Hazard label(s) 2.2

tunnel restriction code C/E

Classification code 2A

Marine transport IMDG

EmS: F-C, S-V

! SECTION 15: Regulatory information**151. Safety, health and environmental regulations/legislation specific for the substance or mixture****! Other regulations (EU)**

Regulation (EU) No 517/2014 on fluorinated greenhouse gases.

Regulation (EU) 2015/2068 establishing, pursuant to Regulation (EU) No 517/2014, the format of labels for products and equipment containing fluorinated greenhouse gases.

Regulation (EU) 2015/2067 establishing, pursuant to Regulation (EU) No 517/2014, ~ certification ~ as regards stationary refrigeration, air conditioning and heat pump equipment, and ~ containing fluorinated greenhouse gases.

VOC standard

VOC content >=99 % 20 °C 5740 hPa

152. Chemical Safety Assessment

For this substance a chemical safety assessment is not required according to Article 14 (4) of the REACH-regulation (EC) No 1907/2006 since it neither meets the classification criteria for health and the environment nor represents a PBT- or vPvB-substance.

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

For this substance a chemical safety assessment has been carried out.

An exposure scenario is not required.

! SECTION 16: Other information**! Recommended uses and restrictions**

Use in accordance with regulation (EU) No 517/2014 on fluorinated greenhouse gases.

National and local regulations concerning chemicals shall be observed.

Further information

All declarations of safety-data-sheet refer to pure substance.

The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.

Indication of changes: "!" = Data changed compared with the previous version. Previous version: 16.2

! Sources of key data used

For the preparation of this safety data sheet, information from our suppliers as well as data from the "database of registered substances" of the European Chemicals Agency (ECHA) were used.