

**Safety Data Sheet according to Regulation (EC)
No. 1907/2006 (REACH)**

Printed 02.09.2013
revision 02.09.2013 (GB) Version 16.0
R 134a
0045 + 0046



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

1.1. Product identifier

Name of product	R 134a Art-Nr(n): 0045 + 0046
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

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	GHC Gerling, Holz & Co. Handels GmbH Ruhrstraße 113, D-22761 Hamburg Phone +49 (0) 40 853 123-0, Fax +49 (0) 40 853 123-66 E-Mail hamburg@ghc.de Internet www.ghc.de
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Advice	GHC Gerling, Holz & Co. Handels GmbH Phone +49 (0) 40 853 123-0 Fax +49 (0) 40 853 123-66 E-mail (competent person): msds@ghc.de
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1.4. Emergency telephone number

Emergency advice	Giftinformationszentrum (Poison Control Centre) Mainz Phone +49 (0) 6131 19240
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SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to 67/548/EEC or 1999/45/EC

Additional hints

The substance is not classified as hazardous according to directive 67/548/EEC.

**Safety Data Sheet according to Regulation (EC)
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Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard classes and Hazard categories Hazard Statements Classification procedure

Liquef. Gas **H280**

Hazard statements for physical hazards

H280 Contains gas under pressure; may explode if heated.

Additional hints

The substance is not classified as hazardous according to directive 67/548/EEC.

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 covered by the Kyoto Protocol.

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.

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SECTION 3: Composition/ information on ingredients

3.1. Substances

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.
Adhere to personal protective measures when giving first aid.
Seek medical advice immediately.

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. Apply a sterile dressing. Obtain medical assistance.

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.

**Safety Data Sheet according to Regulation (EC)
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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.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

See chapter 8.

Remove persons to safety.

Evacuate area.

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).

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

Disposal: see section 13

Informations for safe handling see chapter 7.

Informations for personal protective equipment see chapter 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.

**Safety Data Sheet according to Regulation (EC)
No. 1907/2006 (REACH)**

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revision 02.09.2013 (GB) Version 16.0

R 134a
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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 or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.

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 steel and carbon steel, tempered steel, aluminium alloys, stainless steel.
Valve: Suitable materials: Brass, copper alloys, carbon steels, aluminium alloys, stainless steel.

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 (EC) No 842/2006 on certain fluorinated greenhouse gases.

Safety Data Sheet according to Regulation (EC)**No. 1907/2006 (REACH)**Printed 02.09.2013
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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 / 2005, United Kingdom

Additional adviceDNEL (consumers, inhalation, long-term, systemic effects): 2476 mg/m³.DNEL (workers, inhalation, long-term, systemic effects): 13936 mg/m³.**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 according to 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 according to EN 374.

Eye protection

Safety goggles, in case of increased risk add protective face shield

Safety goggles with side protection according to EN 166.

Skin protection

Safety shoes with steel toe.

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

Limitation and surveillance of the environment

PNEC (freshwater): 0,1 mg/l

PNEC (sea water): 0.01 mg/l

PNEC (water): 1 mg/l (temporary use / release)

PNEC (freshwater sediment): 0,75 mg/kg sediment

PNEC (water): 73 mg/l (wastewater treatment plants)

See chapter 7.

Additional advice on system design

Transfer and handle only in enclosed systems.

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

Gaseous / liquefied under pressure.

Colour

colourless

Odour

ethereal

Important health, safety and environmental information

	Value	Temperature	at	Method	Remark
pH value in delivery state	not applicable				

**Safety Data Sheet according to Regulation (EC)
No. 1907/2006 (REACH)**

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revision 02.09.2013 (GB) Version 16.0

R 134a
0045 + 0046



	Value	Temperature	at	Method	Remark
boiling point	-26 °C		1013 hPa		
melting point	-108 °C				
Flash point	no				
Flammability (gas)	no				The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, it may become flammable.
Ignition temperature	not determined				
Autoignition	743 °C				
Lower explosion limit	no				
Upper explosion limit	no				
Vapour pressure	5740 hPa	20 °C			
Relative density	1,226 g/cm3	20 °C			liquid phase
Vapour density	3,52	20 °C			air = 1
Solubility in water	1 g/l	25 °C			
Partition coefficient (log p_{OW})	1,06	25 °C		OECD 107	
Viscosity dynamic	0,22 mPa*s	20 °C			liquid phase
Vapourisation rate	No data available				
Oxidising properties	no				
Explosive properties	no				

9.2. Other information

Vapours are heavier than air.

**Safety Data Sheet according to Regulation (EC)
No. 1907/2006 (REACH)**

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R 134a
0045 + 0046

SECTION 10: Stability and reactivity

10.1. Reactivity

See section "Possibility of hazardous reactions".

10.2. Chemical stability

Stable under normal conditions.

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.

10.4. Conditions to avoid

May form a flammable mixture with air or oxidizing agents at high pressure.

Heat sources / heat - risk of bursting.

10.5. Incompatible materials

Materials to avoid

Metals in powder form.

Metallic salts in powder form.

Oxidants.

Alkali metals.

Earth alkali metals.

10.6. Hazardous decomposition products

Carbon monoxide

Carbon dioxide

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/Irritability/Sensitization

	Value/Validation	Species	Method	Remark
LD50 acute oral	not applicable			
LD50 acute dermal	not applicable			
LC50 acute inhalation	567000 ppm (4 h)	rat	OECD 403	
Irritability skin	low irritant effect - not necessary to label	rabbit		
Irritability eye	low irritant - no labeling duty	rabbit eye		

**Safety Data Sheet according to Regulation (EC)
No. 1907/2006 (REACH)**

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R 134a
0045 + 0046



	Value/Validation	Species	Method	Remark
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.
Mutagenicity			OECD 471 / 473	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)

No data available

Specific target organ toxicity (repeated exposure)

no

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		
Bacteria	EC10 > 730 mg/l (6 h)	growth of Ps. putida		

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12.2. Persistence and degradability

**Physico-chemical
degradability**

At normal temperature very highly volatile or gaseous product that can be released to atmosphere.
Elimination test cannot be employed.

**Biological
degradability**

3 % (28 d)

OECD 301 D

not readily degradable

12.3. Bioaccumulative potential

Does not bioaccumulate.

12.4. Mobility in soil

Koc: 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: 1300

ODP: 0

General regulation

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 91/689/EEC 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

Land and inland navigation transport ADR/RID

UN 3159 REFRIGERANT GAS R 134a (1,1,1,2-TETRAFLUORETHAN), 2.2, (C/E), Classification code: 2A

Marine transport IMDG

UN 3159 REFRIGERANT GAS R 134a (1,1,1,2-TETRAFLUOROETHANE), 2.2

EmS: F-C, S-V

Air transport ICAO/IATA-DGR

UN 3159 Refrigerant gas R 134a (1,1,1,2-TETRAFLUOROETHANE), 2.2

Special precautions for user

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

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

not applicable

No transport as bulk according IBC - Code.

**Safety Data Sheet according to Regulation (EC)
No. 1907/2006 (REACH)**

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revision 02.09.2013 (GB) Version 16.0
R 134a
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SECTION 15: Regulatory information

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

Other regulations (EU)

Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases.

Regulation (EC) No 303/2008 establishing minimum requirements and the conditions for mutual recognition for the certification of companies and personnel as regards stationary refrigeration, air conditioning and heat pump equipment containing certain fluor

Regulation (EC) No 1494/2007 establishing, pursuant to Regulation (EC) No 842/2006, the form of labels and additional labelling requirements as regards products and equipment containing certain fluorinated greenhouse gases.

VOC standard

VOC content >=99 % 20 °C 5740 hPa

15.2. 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 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.

SECTION 16: Other information

Recommended uses and restrictions

Use in accordance with regulation (EC) No 842/2006 on certain 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.

H280 Contains gas under pressure; may explode if heated.