

**Tetrafluoroethane (R134a)****NOAL\_0133**

Country : SE / Language : EN

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

Trade name : Tetrafluoroethane (R134a)  
SDS no : NOAL\_0133  
Chemical description : Tetrafluoroethane (R134a)  
CAS-No. : 811-97-2  
EC-No. : 212-377-0  
EC Index-No. : ---  
Registration-No. : 01-2119459374-33  
Chemical formula : C<sub>2</sub>H<sub>2</sub>F<sub>4</sub>

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

Relevant identified uses : Industrial and professional uses. Perform risk assessment prior to use.  
Test gas/Calibration gas.  
Laboratory use.  
Use as refrigerant.  
Contact supplier for more information on uses.  
Uses advised against : Consumer use.

**1.3. Details of the supplier of the safety data sheet****Company identification**

AIR LIQUIDE GAS AB  
Lundavägen 151  
21209 Malmö - SWEDEN  
T +46 40 38 10 00  
[eunordic-sds@airliquide.com](mailto:eunordic-sds@airliquide.com)

E-Mail address (competent person) : [eunordic-sds@airliquide.com](mailto:eunordic-sds@airliquide.com)

**1.4. Emergency telephone number**

Emergency telephone number : 112  
Availability  
(24 / 7)

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

Physical hazards : Gases under pressure : Liquefied gas H280

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

Hazard pictograms (CLP) :



GHS04

Signal word (CLP) : Warning

Hazard statements (CLP) : H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP)

- Storage : P403 - Store in a well-ventilated place.

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Supplemental information : Contains fluorinated greenhouse gases. Listed in Annex I of EU 517/2014 as amended.

**2.3. Other hazards**: Asphyxiant in high concentrations.  
Contact with liquid may cause cold burns/frostbite.**SECTION 3: Composition/information on ingredients****3.1. Substances**

Name	Product identifier	Composition [V-%]:	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Tetrafluoroethane (R134a)	(CAS-No.) 811-97-2 (EC-No.) 212-377-0 (EC Index-No.) --- (Registration-No.) 01-2119459374-33	100	Press. Gas (Liq.), H280

*Contains no other components or impurities which will influence the classification of the product.***3.2. Mixtures** : Not applicable.**SECTION 4: First aid measures****4.1. Description of first aid measures**

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
- Skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

**4.2. Most important symptoms and effects, both acute and delayed**: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.  
Refer to section 11.**4.3. Indication of any immediate medical attention and special treatment needed**

: None.

**SECTION 5: Firefighting measures****5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

**5.2. Special hazards arising from the substance or mixture**

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : Carbon monoxide. Hydrogen fluoride. Carbonyl fluoride.

**5.3. Advice for firefighters**

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.  
If possible, stop flow of product.  
Use water spray or fog to knock down fire fumes if possible.  
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus.

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Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

**SECTION 6: Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**

- : Try to stop release.
- Evacuate area.
- Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
- Ensure adequate air ventilation.
- Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
- Act in accordance with local emergency plan.
- Stay upwind.
- Oxygen detectors should be used when asphyxiating gases may be released.

**6.2. Environmental precautions**

- : Try to stop release.

**6.3. Methods and material for containment and cleaning up**

- : Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost).

**6.4. Reference to other sections**

- : See also sections 8 and 13.

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

Safe use of the product

- : Do not breathe gas.
- Avoid release of product into atmosphere.
- The product must be handled in accordance with good industrial hygiene and safety procedures.
- Only experienced and properly instructed persons should handle gases under pressure.
- Consider pressure relief device(s) in gas installations.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Do not smoke while handling product.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Avoid suck back of water, acid and alkalis.

Safe handling of the gas receptacle

- : Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Protect containers from physical damage; do not drag, roll, slide or drop.
- When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
- Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- If user experiences any difficulty operating valve discontinue use and contact supplier.
- Never attempt to repair or modify container valves or safety relief devices.
- Damaged valves should be reported immediately to the supplier.
- Keep container valve outlets clean and free from contaminants particularly oil and water.

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Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.

Close container valve after each use and when empty, even if still connected to equipment.

Never attempt to transfer gases from one cylinder/container to another.

Never use direct flame or electrical heating devices to raise the pressure of a container.

Do not remove or deface labels provided by the supplier for the identification of the content of the container.

Suck back of water into the container must be prevented.

Open valve slowly to avoid pressure shock.

### 7.2. Conditions for safe storage, including any incompatibilities

- : Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion.
- Container valve guards or caps should be in place.
- Containers should be stored in the vertical position and properly secured to prevent them from falling over.
- Stored containers should be periodically checked for general condition and leakage.
- Keep container below 50°C in a well ventilated place.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible materials.

### 7.3. Specific end use(s)

: None.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Tetrafluoroethane (R134a) (811-97-2)	
Sweden - Occupational Exposure Limits	
Local name	HFC 134 a
nivågränsvärde (NVG) (mg/m <sup>3</sup> )	2000 mg/m <sup>3</sup> 2000 mg/m <sup>3</sup>
nivågränsvärde (NVG) (ppm)	500 ppm 500 ppm
kortidsvärde (KTV) (mg/m <sup>3</sup> )	3000 mg/m <sup>3</sup> 3000 mg/m <sup>3</sup>
kortidsvärde (KTV) (ppm)	750 ppm 750 ppm
Anmärkning (SE)	V (Vägledande kortidsgränsvärde ska användas som ett rekommenderat högsta värde som inte bör överskridas)
Tetrafluoroethane (R134a) (811-97-2)	
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Tetrafluoroethane (R134a) (811-97-2)	
DNEL: Derived no effect level (Workers)	
Long-term - systemic effects, inhalation	14000 mg/m <sup>3</sup>
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Long-term - systemic effects, inhalation	14000 mg/m <sup>3</sup>

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PNEC: Predicted no effect concentration	
Aqua (freshwater)	0.1 mg/l
Aqua (marine water)	0.01 mg/l
Aquatic, intermittent releases	1 mg/l
Sediment, freshwater	0.75 mg/kg dwt
Micro-organisms in sewage treatment plant (STP)	73 mg/l
<b>Tetrafluoroethane (R134a) (811-97-2)</b>	
PNEC: Predicted no effect concentration	
Aqua (freshwater)	0.1 mg/l
Aqua (marine water)	0.01 mg/l
Aquatic, intermittent releases	1 mg/l
Sediment, freshwater	0.75 mg/kg dwt
Micro-organisms in sewage treatment plant (STP)	73 mg/l

### 8.2. Exposure controls

#### 8.2.1. Appropriate engineering controls

- : Provide adequate general and local exhaust ventilation.
- Systems under pressure should be regularly checked for leakages.
- Ensure exposure is below occupational exposure limits (where available).
- Oxygen detectors should be used when asphyxiating gases may be released.
- Consider the use of a work permit system e.g. for maintenance activities.

#### 8.2.2. Individual protection measures, e.g. personal protective equipment

- : A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:  
PPE compliant to the recommended EN/ISO standards should be selected.
- Eye/face protection
  - : Wear goggles when transfilling or breaking transfer connections.  
Standard EN 166 - Personal eye-protection - specifications.
- Skin protection
  - Hand protection
    - : Wear working gloves when handling gas containers.  
Standard EN 388 - Protective gloves against mechanical risk.
    - Wear cold insulating gloves when transfilling or breaking transfer connections.  
Standard EN 511 - Cold insulating gloves.
  - Other
    - : Wear safety shoes while handling containers.  
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
- Respiratory protection
  - : Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known.  
Use gas filters with full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers.  
Gas filters do not protect against oxygen deficiency.  
Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.  
Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks .  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
- Thermal hazards
  - : None in addition to the above sections.

#### 8.2.3. Environmental exposure controls

- : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

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

## Appearance

• Physical state at 20°C / 101.3kPa	: Gas
• Colour	: Colourless.
Odour	: Ethereal.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
pH	: Not applicable for gases and gas mixtures.
Melting point / Freezing point	: -101 °C
Boiling point	: -26.1 °C
Flash point	: Not applicable for gases and gas mixtures.
Evaporation rate	: Not applicable for gases and gas mixtures.
Flammability (solid, gas)	: Non flammable.
Explosive limits	: Non flammable.
Vapour pressure [20°C]	: 4.7 bar(a)
Vapour pressure [50°C]	: 13.2 bar(a)
Vapour density	: Not applicable.
Relative density, liquid (water=1)	: No reliable data available.
Relative density, gas (air=1)	: 3.6
Water solubility	: 1930 mg/l
Partition coefficient n-octanol/water (Log Kow)	: 0.94
Auto-ignition temperature	: Non flammable.
Decomposition temperature	: Not applicable.
Viscosity	: No reliable data available.
Explosive properties	: Not applicable.
Oxidising properties	: Not applicable.

**9.2. Other information**

Molar mass	: 102 g/mol
Critical temperature [°C]	: 101 °C
Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

**SECTION 10: Stability and reactivity****10.1. Reactivity**

: No reactivity hazard other than the effects described in sub-sections below.

**10.2. Chemical stability**

: Stable under normal conditions.

**10.3. Possibility of hazardous reactions**

: None.

**10.4. Conditions to avoid**

: Avoid moisture in installation systems.

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### 10.5. Incompatible materials

: Moisture.  
For additional information on compatibility refer to ISO 11114.

### 10.6. Hazardous decomposition products

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

**Acute toxicity** : Classification criteria are not met.

LC50 Inhalation - Rat [ppm]	567000 ppm/4h
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#### Tetrafluoroethane (R134a) (811-97-2)

LC50 Inhalation - Rat [ppm]	567000 ppm/4h
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**Skin corrosion/irritation** : No known effects from this product.  
**Serious eye damage/irritation** : No known effects from this product.  
**Respiratory or skin sensitisation** : No known effects from this product.  
**Germ cell mutagenicity** : No known effects from this product.  
**Carcinogenicity** : No known effects from this product.  
**Reproductive toxicity** :  
Toxic for reproduction : Fertility : No known effects from this product.  
Toxic for reproduction : unborn child : No known effects from this product.  
**STOT-single exposure** : No known effects from this product.  
**STOT-repeated exposure** : No known effects from this product.  
**Aspiration hazard** : Not applicable for gases and gas mixtures.

## SECTION 12: Ecological information

### 12.1. Toxicity

Assessment : Classification criteria are not met.

EC50 48h - Daphnia magna [mg/l] : 930 mg/l  
EC50 72h - Algae [mg/l] : No data available.  
LC50 96 h - Fish [mg/l] : 450 mg/l

#### Tetrafluoroethane (R134a) (811-97-2)

EC50 48h - Daphnia magna [mg/l]	930 mg/l
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	450 mg/l

### 12.2. Persistence and degradability

Assessment : Not readily biodegradable.

### 12.3. Bioaccumulative potential

Assessment : Not expected to bioaccumulate due to the low log Kow (log Kow < 4).  
Refer to section 9.

### 12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.  
Partition into soil is unlikely.

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### 12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

### 12.6. Other adverse effects

Other adverse effects : No known effects from this product.

Effect on the ozone layer : None.

Global warming potential [CO<sub>2</sub>=1] : 1430

Effect on global warming : Contains fluorinated greenhouse gases. Listed in Annex I of EU 517/2014 as amended. When discharged in large quantities may contribute to the greenhouse effect. For quantities refer to cylinder label.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Refer to supplier's waste gas recovery programme.  
 Contact supplier if guidance is required.  
 Discharge to atmosphere in large quantities should be avoided.  
 Do not discharge into any place where its accumulation could be dangerous.  
 Ensure that the emission levels from local regulations or operating permits are not exceeded.  
 Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.  
 Return unused product in original container to supplier.

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 14 06 01 \*: Chlorofluorocarbons, HCFC, HFC.

### 13.2. Additional information

: External treatment and disposal of waste should comply with applicable local and/or national regulations.

## SECTION 14: Transport information

### 14.1. UN number

UN-No. : 3159

### 14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134A)

Transport by air (ICAO-TI / IATA-DGR) : 1,1,1,2-Tetrafluoroethane

Transport by sea (IMDG) : 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)

### 14.3. Transport hazard class(es)

Labelling :



2.2 : Non-flammable, non-toxic gases.

### Transport by road/rail (ADR/RID)

Class : 2

Classification code : 2A

Hazard identification number : 20

Tunnel Restriction : C/E - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage : Passage forbidden through tunnels of category E



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**Transport by air (ICAO-TI / IATA-DGR)**

Class / Div. (Sub. risk(s)) : 2.2

**Transport by sea (IMDG)**

Class / Div. (Sub. risk(s)) : 2.2

Emergency Schedule (EmS) - Fire : F-C

Emergency Schedule (EmS) - Spillage : S-V

**14.4. Packing group**

Transport by road/rail (ADR/RID) : Not established.

Transport by air (ICAO-TI / IATA-DGR) : Not established.

Transport by sea (IMDG) : Not established.

**14.5. Environmental hazards**

Transport by road/rail (ADR/RID) : None.

Transport by air (ICAO-TI / IATA-DGR) : None.

Transport by sea (IMDG) : None.

**14.6. Special precautions for user****Packing Instruction(s)**

Transport by road/rail (ADR/RID) : P200

Transport by air (ICAO-TI / IATA-DGR)

Passenger and Cargo Aircraft : 200.

Cargo Aircraft only : 200.

Transport by sea (IMDG) : P200

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment.

Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.

Before transporting product containers:

- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

**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****EU-Regulations**

Restrictions on use : None.

Seveso Directive : 2012/18/EU (Seveso III) : Not covered.

**National regulations**

National legislation : Ensure all national/local regulations are observed.

**15.2. Chemical safety assessment**

: A CSA has been carried out.

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**SECTION 16: Other information**

- Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010.
- Abbreviations and acronyms : ATE - Acute Toxicity Estimate  
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008  
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006  
EINECS - European Inventory of Existing Commercial Chemical Substances  
CAS# - Chemical Abstract Service number  
PPE - Personal Protection Equipment  
LC50 - Lethal Concentration to 50 % of a test population  
RMM - Risk Management Measures  
PBT - Persistent, Bioaccumulative and Toxic  
vPvB - Very Persistent and Very Bioaccumulative  
STOT- SE : Specific Target Organ Toxicity - Single Exposure  
CSA - Chemical Safety Assessment  
EN - European Standard  
UN - United Nations  
ADR - International Agreement concerning the International Carriage of Dangerous Goods by Road  
IATA - International Air Transport Association  
IMDG code - International Maritime Dangerous Goods  
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail  
WGK - Water Hazard Class  
STOT - RE : Specific Target Organ Toxicity - Repeated Exposure
- Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training.

## Full text of H- and EUH-statements

Press. Gas (Liq.)	Gases under pressure : Liquefied gas
H280	Contains gas under pressure; may explode if heated

## DISCLAIMER OF LIABILITY

- : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
- Details given in this document are believed to be correct at the time of going to press.
- Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.