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

1.1 Product identifier

Trade name/designation R-134a (1,1,1,2,-Tetrafluorethan) Type test leak (not restricted)

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

Use of the substance/mixture
test gas

1.3 Details of the supplier of the safety data sheet

Supplier

INFICON GmbH
Bonner Straße 498, D-50968 Köln
Telefon +49(0)221- 56788-0, Telefax +49(0)221- 56788-90
E-Mail leakdetection@inficon.com
Internet www.inficon.com

Advice

Research / Design Telefon +49(0)221- 56788-354

1.4 Emergency telephone number

Poison Information Centre Bonn: +49(0)228 - 19 240

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP]	Classification procedure
Press. Gas (Liq.), H280	

hazard statements for physical hazards
H280 Contains gas under pressure; may explode if heated.
H280 Contains gas under pressure; may explode if heated.

2.2 Label elements

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

product identifiers

Trade name/designation R-134a (1,1,1,2,-Tetrafluorethan) Typ Testleck (n.b.)

Hazard pictograms

GHS04

Signal word
Warning

Hazard statements
H280 Contains gas under pressure; may explode if heated.

Precautionary statements
P102 Keep out of reach of children.
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

2.3 Other hazards

Standard phrases for special risks to human beings and the environment
Rapid evaporation of the liquid can cause cold burns.
Vapours are heavier than air and may cause asphyxiation due to oxygen displacement from the atmosphere.

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

not applicable

3.2 Mixtures

Description
pressure-liquefied gas

Hazardous ingredients

CAS No.	EC No.	Substance name	Concentration	Classification according to Regulation (EC) No 1272/2008 [CLP]
811-97-2	212-377-0	1,1,1,2-Tetrafluorethan; Norfluran	>= 99 %	

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
Remove contaminated, saturated clothing immediately.
In case of allergic symptoms seek medical advice immediately.
If symptoms develop or in the event of uncertainty, seek medical attention.
In the event of persistent symptoms receive medical treatment.
Do not leave affected person unattended.
Remove affected person from the danger area and lay down.

Following inhalation
Remove casualty to fresh air and keep warm and at rest.
In high concentrations may cause asphyxiation.
Remove aggrieved persons from danger zone
In the event of symptoms refer for medical treatment.

Following skin contact
In case of irritation consult a doctor.
Wash immediately with:
Water
In case of frostbite, wash with plenty of water; do not remove clothing.

After eye contact
After contact with the eyes, rinse with water with the eyelids open for a sufficient length of time, then consult an ophthalmologist immediately.
Remove contact lens.
In the event of persistent symptoms receive medical treatment.

After ingestion
not relevant

4.2 Most important symptoms and effects, both acute and delayed

Symptoms
The following symptoms may occur:
Unconsciousness
Headache
Drowsiness
Dizziness

4.3 Indication of any immediate medical attention and special treatment needed

Notes for the doctor
Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

No data available

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products
Exposure to fire may cause containers to rupture / explode.
Fire gas of organic material has to be classed invariably as respiratory poison.
Ignitable gas-air-mixtures can be formed under special conditions.
In the event of fire the following can be released:
Hydrogen fluoride
Fluorine phosgene

5.3 Advice for firefighters

Special protective equipment for firefighters:
In case of fire: Wear self-contained breathing apparatus.
Breathing protection and eye protection is required for fire-fighting under presence of fume and vapour

Additional information
The product itself does not burn.
Heat action leads to pressure increase - risk of bursting
Co-ordinate fire-fighting measures to the fire surroundings.
Do not inhale explosion and combustion gases.
Contaminated fire-fighting water must be collected separately; it shall not run into the sewage system, aquatic environment or into the soil.
Remove the endangered containers or spray them with cold water

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Avoid skin and eye contact

For emergency responders
Ensure adequate ventilation.
Gas/vapours are heavier than air. They may Accumulate in confined spaces, in particular at or below ground.
Remove persons to safety.
Keep people away and stay on the upwind side.
Avoid skin contact with running out liquid (risk of frostbites!).
Personal protection equipment

6.2 Environmental precautions

Do not allow to enter into surface water or drains.

6.3 Methods and material for containment and cleaning up

For containment
Take up with absorbent material.

For cleaning up
Leave to vapourize.

6.4 Reference to other sections

Safe handling: see section 7
Personal protection equipment: see section 8
Disposal: see section 13

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures

If local exhaust ventilation is not possible or not sufficient, the entire working area should be ventilated by technical means.
Use only in well-ventilated areas.
Product is not inflammable
Usual measures for fire prevention.
Do not inhale gases.
Avoid:
Eye contact
Skin contact

Advices on general occupational hygiene

When using do not eat, drink, smoke, sniff.
Remove contaminated, saturated clothing immediately.
Work in rooms with good ventilation.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Keep/Store only in original container.
Keep container tightly closed.

Storage class

LGK2A Gases

Materials to avoid

Do not store together with:
Metal

Further information on storage conditions

Keep in a cool, well-ventilated place.
Keep away from foods and beverages.
Keep away from ignition sources.
UV-radiation/sunlight
Heat

7.3 Specific end use(s)

Recommendation

See section 1.2

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limit values

CAS No.	EC No.	Substance name	occupational exposure limit value
811-97-2		1,1,1,2-Tetrafluoroethane (HFC 134a)	1000 [ml/m3(ppm)] 4240 [mg/m3] EH40/2005
811-97-2		1,1,1,2-Tetrafluoroethane	1000 [ml/m3(ppm)] 4240 [mg/m3] (UK)

DNEL worker

CAS No.	Substance name	DNEL value	DNEL type	Remark
811-97-2	1,1,1,2-Tetrafluorethan; Norfluran	13936 mg/m³	long-term inhalative (systemic)	

DNEL Consumer

CAS No.	Substance name	DNEL value	DNEL type	Remark
811-97-2	1,1,1,2-Tetrafluorethan; Norfluran	2476 mg/m³	long-term inhalative (systemic)	

PNEC

CAS No.	Substance name	PNEC Value	PNEC type	Remark
811-97-2	1,1,1,2-Tetrafluorethan; Norfluran	0.1 mg/L	aquatic, freshwater	
811-97-2	1,1,1,2-Tetrafluorethan; Norfluran	0.01 mg/L	aquatic, marine water	
811-97-2	1,1,1,2-Tetrafluorethan; Norfluran	1 mg/L	aquatic, intermittent release	
811-97-2	1,1,1,2-Tetrafluorethan; Norfluran	0.75 mg/kg	sediment, freshwater	
811-97-2	1,1,1,2-Tetrafluorethan; Norfluran	73 mg/L	sewage treatment plant (STP)	

8.2 Exposure controls

Appropriate engineering controls

Technical measures to prevent exposure

For good space ventilation provide, if necessary exhaust on the job.
Sufficient ventilation and exhaustion.

Personal protection equipment

Eye/face protection

Safety goggles (DIN EN 166)

Hand protection

Gloves with long cuffs
cold resistant
Glove material specification [make/type, thickness, permeation time/life, wetting resistance]: butyl rubber, 0,7mm;480min; 60 min.
The protective gloves to be used must comply with the specifications of EC directive 89/686/EEC and the resultant standard EN374.
The selection of a suitable glove depends and from manufacturer to manufacturer different not only on the material, but also on further quality criteria.
The exact breakthrough time of the glove material is to be inquired from the protection glove manufacturer and must be strictly adhered to.

Body protection:

Protective clothing

Respiratory protection

Respiratory protection necessary at:
insufficient ventilation
insufficient exhaust
prolonged exposure
high concentrations
Suitable respiratory protection apparatus:
Self-contained respirator (breathing apparatus) (DIN EN 133)

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state

compressed liquified gas

Colour
colourless

Odour
like:
Ether

Safety relevant basis data

	Value	Method	Source, Remark
Odour threshold:	not determined		
pH	not determined		
Melting point/freezing point	not determined		
Initial boiling point and boiling range	-26 °C		
Flash point	not determined		
Evaporation rate	not determined		
flammability	not determined		
Upper/lower flammability or explosive limits	Lower explosion limit		not applicable
Vapour pressure	5700 hPa (20°C)		
Vapour density	not determined		
Density	1.21 (25°C)		as liquid
Solubility(ies)	Water solubility (g/L) 1500 mg/L (25°C)		
Partition coefficient: n-octanol/water	1.06		
Auto-ignition temperature	not determined		
Decomposition temperature			No decomposition if used as directed.
Viscosity	not determined		
Explosive properties:	not determined		
Oxidising properties	not determined		

9.2 Other information

Other safety information
none

SECTION 10: Stability and reactivity

10.1 Reactivity

The product is considered non-reactive under normal conditions of use.

10.2 Chemical stability

The product is chemically stable under recommended conditions of storage, use and temperature.

10.3 Possibility of hazardous reactions

Reactions with alkali metals.
Reactions with earth alkali metals.

10.4 Conditions to avoid

strong heating

10.5 Incompatible materials

Alkali metals
Alkaline earth metal

10.6 Hazardous decomposition products

No risk of production of decomposition products when appropriately handled and stored.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Animal data

	Effective dose	Method	Source, Remark
Acute oral toxicity	not determined		
Acute dermal toxicity	not determined		
Acute inhalation toxicity	not determined		

Assessment/classification
Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Assessment/classification
Based on available data, the classification criteria are not met.

Eye damage/irritation

Animal data

Result / evaluation	Method	Source, Remark
No data available		

Assessment/classification
Based on available data, the classification criteria are not met.

Sensitisation to the respiratory tract

Assessment/classification
Based on available data, the classification criteria are not met.

Skin sensitisation

Assessment/classification
Based on available data, the classification criteria are not met.

Germ cell mutagenicity

	Value	Method	Result / evaluation	Remark
In vitro mutagenicity/genotoxicity				No data available

Carcinogenicity

Animal data

	Value	Method	Result / evaluation	Remark
Carcinogenicity				No data available

Reproductive toxicity

Assessment/classification
No data available

Overall Assessment on CMR properties
Based on available data, the classification criteria are not met.

STOT-single exposure

STOT SE 1 and 2

Assessment/classification
Based on available data, the classification criteria are not met.

STOT SE 3

Irritation to respiratory tract

Assessment/classification
Based on available data, the classification criteria are not met.

Narcotic effects

Assessment/classification
Based on available data, the classification criteria are not met.

STOT-repeated exposure

Assessment/classification
Based on available data, the classification criteria are not met.

Aspiration hazard

Assessment/classification
Based on available data, the classification criteria are not met.

Additional information

Gases have a suffocating effect.
Refrigerated liquefied gas. Contact with the product can cause cold burns or frostbite.
Other hazardous properties may not be excluded.
The product is to be handled with the caution usual with chemicals.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity

	Effective dose	Method	Source, Remark
Acute (short-term) fish toxicity	LC50: 450 mg/L Salmo Species Test durarion 96 h		CAS No.811-97-2 1,1,1,2-Tetrafluorethan; Norfluran
Chronic (long-term) fish toxicity	not determined		
Acute (short-term) toxicity to crustacea	EC50 980 mg/L Daphnia magna (Big water flea) Test durarion 48 h		CAS No.811-97-2 1,1,1,2-Tetrafluorethan; Norfluran
Chronic (long-term) toxicity to crustacea	not determined		
Acute (short-term) toxicity to aquatic algae and cyanobacteria	EC50 100 mg/L		CAS No.811-97-2 1,1,1,2-Tetrafluorethan; Norfluran
Toxicity to other aquatic plants/organisms	not determined		
Toxicity to microorganisms	not determined		

12.2 Persistence and degradability

Assessment/classification
not persistent.

12.3 Bioaccumulative potential

	Value	Method	Source, Remark
Partition coefficient: n-octanol/water	1.06		

Assessment/classification
No indication of bioaccumulation potential.

12.4 Mobility in soil

Assessment/classification
This information is not available.

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

Additional ecotoxicological information

Additional information
No risk of ecological problems if properly handled and used
Do not allow uncontrolled discharge of product into the environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Waste codes/waste designations according to EWC/AVV

Waste code product	Waste name
140601 *	chlorofluorocarbons, HCFC, HFC

Waste code packaging	Waste name
150104	metallic packaging

Appropriate disposal / Product
Dispose of waste according to applicable legislation.

Appropriate disposal / Package
Disposal in accordance with local regulations.

Remark
The waste code must be allocated in compliance with the EAK-regulation referring to the specific process and the sector.

SECTION 14: Transport information

	Land transport (ADR/RID)	Sea transport (IMDG)	Air transport (ICAO-TI / IATA-DGR)
14.1 UN number	2037	2037	2037
14.2 UN proper shipping name	RECEPTACLES, SMALL, CONTAINING GAS	RECEPTACLES, SMALL, CONTAINING GAS	Receptacles, small, containing gas
14.3 Transport hazard class(es)	2	2.2	2.2
14.4 Packing group	-	-	-
14.5 Environmental hazards	No	No	No

14.6 Special precautions for user

No data available

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

not applicable

All transport carriers

24h EMERGENCY CONTACT (TRANSPORT) +49(0)178 433 7434 (Consultank GmbH)
ADR u. IMDG: TRANSPORT AS: UN 2037 RECEPTACLES, SMALL CONTAINING GAS (GAS CARTIDGES), 2.2; not restricted as per Special Provision 191 (ADR, IMDG)
ICAO/IATA-DGR: TRANSPORT AS: UN 2037 RECEPTACLES, SMALL; CONTAINING GAS, 2.2; not restricted as per Special Provision A98

Land transport (ADR/RID)

UN number	2037
UN proper shipping name	RECEPTACLES, SMALL, CONTAINING GAS
Transport hazard class(es)	2
Hazard label(s)	2.2
Classification code:	5A
Packing group	-
Environmental hazards	No
Limited quantity (LQ)	1 L
Special Provisions	191 303 344
tunnel restriction code	E

Sea transport (IMDG)

UN number	2037
UN proper shipping name	RECEPTACLES, SMALL, CONTAINING GAS
Transport hazard class(es)	2.2
Packing group	-
Environmental hazards	No
Limited quantity (LQ)	1 L
Marine pollutant	No
EMS	F-D, S-U

Air transport (ICAO-TI / IATA-DGR)

UN number	2037
UN proper shipping name	Receptacles, small, containing gas
Transport hazard class(es)	2.2
Packing group	-
Environmental hazards	No

SECTION 15: Regulatory information

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

National regulations

Water hazard class (WGK)

slightly hazardous to water (WGK 1)
Classification according AwSV

Restrictions of occupation

Adhere to national laws relating to employment limitation.

15.2 Chemical Safety Assessment

For this substance a chemical safety assessment has not been carried out.

SECTION 16: Other information

Abbreviations and acronyms

See overview table at www.euphrac.eu

Key literature references and sources for data

Data sheets of the sub-supplier.

Additional information

National and local regulations concerning chemicals shall be observed.
The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.
Please observe the following disclaimer! --- Our safety data sheets have been compiled according to effective EU-directives, WITHOUT taking into account the special national directives concerning the handling of hazardous substances.
Each user is responsible for the implementation of the national special regulations.
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