Safety data sheet in accordance with 1907/2006/EC

Trade name: R 1234ze

Current version: 1.0.0, Revision: 10.02.2026 **Replaced version:** -, Revision: - **Region:** GER

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

1.1 Product identifier

Trade name

R 1234ze

Substance name	(1E)-1,3,3,3-tetrafluoroprop-1-ene
REACH registration no.	01-0000019758-54

Identification numbers

CAS no.	29118-24-9
EC no.	471-480-0

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

Relevant identified uses of the substance or mixture
Refrigerant

Uses advised against
Consumer use

1.3 Details of the supplier of the safety data sheet

Address
TEGA - Technische Gase und Gasetechnik GmbH
Werner-von-Siemens-Straße 18
97076 Würzburg

Telephone no.	+49 931 2093-220
Fax no.	+49 931 2093-180
e-mail	kaeltemittel@tega.de

Advice on Safety Data Sheet
sdb_info@umco.de

1.4 Emergency telephone number

For medical advice (in German and English):
+49 (0)551 192 40 (Giftinformationszentrum Nord)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification in accordance with Regulation (EC) No 1272/2008 (CLP)
Press. Gas liq.; H280

Classification information
This product is assessed and classified using the methods and criteria below referred to in Article 9 of Regulation (EC) n° 1272/2008:
Physical hazards: determined through assessment data based on the methods or standards referred to in part 2 of Annex I to CLP
Health hazards and environmental hazards: determined through toxicological and ecotoxicological assessment data based on the methods or standards referred to in Part 3 and 4 of Annex I to CLP.

2.2 Label elements

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

Product identifier
29118-24-9 ((1E)-1,3,3,3-tetrafluoroprop-1-ene)

Hazard pictograms

GHS04

Signal word
Warning

Hazard statement(s)
H280 Contains gas under pressure; may explode if heated.

Precautionary statement(s)
P410+P403 Protect from sunlight. Store in a well-ventilated place.

Supplemental label elements
Contains fluorinated greenhouse gases.

2.3 Other hazards

The product does not contain any substance above the legal limits that is included in the list established under Article 59(1) of Regulation (EC) No 1907/2006 on the basis of endocrine disrupting properties or that has endocrine disrupting or endocrine disrupting properties according to Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605. Vapours are heavier than air and can cause asphyxiation by displacing the oxygen in the air. Contact with the liquid can cause cold burns or frostbite.

PBT assessment
The product is not considered to be a PBT.

vPvB assessment
The product is not considered to be a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical characterization

Substance name	(1E)-1,3,3,3-tetrafluoroprop-1-ene
Formula	C3H2F4
Molecular weight	114

Identification numbers

CAS no.	29118-24-9
EC no.	471-480-0

3.2 Mixtures

Not applicable. The product is not a mixture.

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
Remove soiled or soaked clothing immediately. Adhere to personal protective measures when giving first aid. Show MSDS to the attending physician.

After inhalation
Remove affected persons from dangerous area by observing suitable respiratory protection measures. Ensure supply of fresh air. Irregular breathing/no breathing: artificial respiration. Call a doctor immediately.

After skin contact
In case of contact with skin wash off immediately with soap and water. Rinse with much water in case of frostbites. Remove chlothes only after unfreezing. Cover wounds with sterile dressing. Call a doctor immediately.

After eye contact
Remove contact lenses. Rinse eye thoroughly under running water keeping eyelids wide open and protecting the unaffected eye (at least 10 to 15 minutes). Seek medical assistance.

After ingestion
Rinse the mouth thoroughly with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor. Unlikely route of exposure.

4.2 Most important symptoms and effects, both acute and delayed

Effects
Gas reduces oxygen available for breathing. Contact with liquid or refrigerated gas can cause cold burns and frostbite.

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

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Alcohol resistant foam, CO2, powders, water spray; Extinguishing measures to suit surroundings.

Unsuitable extinguishing media
High power water jet

5.2 Special hazards arising from the substance or mixture
In the event of fire, the following can be released: Carbon monoxide and carbon dioxide; Hydrogen fluoride (HF); Carbonyl fluoride; Liquefied gas: Spilled liquid can cause cold burns. This gas is heavier than air and may accumulate in low areas.

5.3 Advice for firefighters
Use self-contained breathing apparatus. Wear full protective suit. Containers close to fire should be transferred to a safe place. Cool closed containers exposed to fire with water. Pressure increase, bursting and explosion hazard during heating. 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
Remove persons to safety. Provide good room ventilation even at ground level (vapours are heavier than air). Use personal protective clothing. Do not breathe gas. Avoid skin contact with leaking liquid (danger of frostbite!).

For emergency responders
No data available. Personal protective equipment (PPE) - see Section 8.

6.2 Environmental precautions
Avoid release in the environment. Suppress gases/vapours/mists with water spray jet.

6.3 Methods and material for containment and cleaning up
Ensure adequate ventilation. Dispose of absorbed material in accordance with the regulations.

6.4 Reference to other sections
Information regarding safe handling, see section 7. Information regarding personal protective measures, see section 8. Information regarding waste disposal, see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Only qualified and trained persons are authorised to handle. Provide good ventilation at the work area (local exhaust ventilation, if necessary). To be used only according to instructions for use. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose containers heat or sources of ignition. In case of accidental release: danger due to low temperature of the liquid product. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Comply with the health and safety at work laws.

General protective and hygiene measures
Do not eat, drink or smoke during work time. Wash hands before breaks and after work. Keep away from foodstuffs and beverages. Do not inhale gases. Provide eye wash fountain in work area. Have emergency shower available.

Advice on protection against fire and explosion

When heating the product, explosive vapour-air mixtures can be formed. Isolate from sources of heat, sparks and open flame. Take precautionary measures against electrostatic loading (earthing necessary during loading operations). Electrical equipment should be protected to the appropriate standard.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Keep container tightly closed in a cool, well-ventilated place, open and handle carefully. Protect from heat and direct sunlight.

Requirements for storage rooms and vessels
Containers which are opened must be carefully closed and kept upright to prevent leakage. Always keep in containers of same material as the original.

Incompatible products
Substances to be avoided, see section 10.

Stoarge Class according TRGS 510
2A Gases (except aerosol dispensers and lighters)

7.3 Specific end use(s)
No data available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limit values

No	Substance name	CAS no.	EC no.
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**	**471-480-0**
	TRGS 900		
	trans-1,3,3,3-Tetrafluorpropen		
	WEL long-term (8-hr TWA reference period)	4700 mg/m³	1000 ml/m³
	Ceiling Limit	2 (II)	
	Notes	Y	

DNEL, DMEL and PNEC values

DNEL values (worker)

No	Substance name			CAS / EC no
	Route of exposure	**Exposure time**	**Effect**	**Value**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**			**29118-24-9 471-480-0**
	inhalative	Long term (chronic)	systemic	1170,8 mg/m³

DNEL value (consumer)

No	Substance name			CAS / EC no
	Route of exposure	**Exposure time**	**Effect**	**Value**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**			**29118-24-9 471-480-0**
	inhalative	Long term (chronic)	systemic	208,1 mg/m³

PNEC values

No	Substance name		CAS / EC no
	ecological compartment	**Type**	**Value**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**		**29118-24-9 471-480-0**
	water	fresh water	0,117 mg/L
	water	marine water	0,012 mg/L
	water	fresh water sediment	1,25 mg/kg dry weight

	water	marine water sediment	0,125	mg/kg dry weight
	soil	-	0,755	mg/kg dry weight

8.2 Exposure controls

Appropriate engineering controls
Ensure adequate ventilation, local exhaust at the work station if necessary.

Personal protective equipment

Respiratory protection
Self-contained breathing apparatus. In case of insufficient ventilation or long-term effect use breathing apparatus. Danger of suffocation due to high concentrations in breathing air.

Eye / face protection
Tightly fitting safety glasses (EN 166).

Hand protection
Low-temperature-resistant gloves (EN 511). Sufficient protection is given wearing suitable protective gloves checked according to i.e. EN 374, in the event of risk of skin contact with the product. Before use, the protective gloves should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and antistatic properties). Adhere to the manufacturer's instructions and information relating to the use, storage, care and replacement of protective gloves. Protective gloves shall be replaced immediately when physically damaged or worn. Design operations thus to avoid permanent use of protective gloves.
Appropriate Material Leather

Other
Chemical-resistant work clothes. Protective shoes.

Environmental exposure controls
No data available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

State of aggregation
gas

Form
liquified gas

Colour
colourless

Odour
weak

pH value	
Source	supplier
Comments	neutral

Boiling point / boiling range	
Value	-19 °C
Source	supplier

Melting point/freezing point
No data available

Decomposition temperature
No data available

Flash point	
Not applicable	
Source	supplier

Ignition temperature			
Value		368	°C
Source	supplier		

Oxidising properties
Not relevant
Source: supplier

Flammability
The product is non-flammable.
Source: supplier

Lower explosion limit
Not relevant
Source: supplier

Upper explosion limit
Not relevant
Source: supplier

Vapour pressure			
Value		4271	hPa
Reference temperature		20	°C
Source	supplier		
Value		11152	hPa
Reference temperature		54,4	°C
Source	supplier		

Relative vapour density	
Value	4
Source	supplier
Comments	Air = 1

Relative density
No data available

Density			
Value		1,17	g/cm³
Reference temperature		21,1	°C
Source	supplier		

Solubility in water			
Value		0,373	g/l
Source	supplier		

Solubility
No data available

Partition coefficient n-octanol/water (log value)			
No	**Substance name**	**CAS no.**	**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**	**471-480-0**
log Pow		1,6	
Source	ECHA		

Kinematic viscosity
Not relevant
Source: supplier

Particle characteristics
Not relevant
Source: supplier

9.2 Other information

Other information
No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available.

10.2 Chemical stability
Stable under recommended storage and handling conditions (See section 7).

10.3 Possibility of hazardous reactions
No hazardous reaction when handled and stored according to provisions.

10.4 Conditions to avoid
Temperatures > 50°C. Heat, naked flames and other ignition sources. Contact with incompatible substances.

10.5 Incompatible materials
Oxidizing agents; Alkali metals

10.6 Hazardous decomposition products
None if stored, handled and transported properly. In case of fire: see section 5.

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute oral toxicity
No data available

Acute dermal toxicity
No data available

Acute inhalational toxicity				
No	**Substance name**	**CAS no.**		**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**		**471-480-0**
LC50		>	207000	ppmV
Duration of exposure			4	h
State of aggregation		Gas		
Species		rat		
Method		OECD 403		
Source		ECHA		

Skin corrosion/irritation			
No	**Substance name**	**CAS no.**	**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**	**471-480-0**
Species		rabbit	
Method		OECD 404	
Source		ECHA	
Evaluation		non-irritant	
Evaluation/classification		Based on available data, the classification criteria are not met.	

Serious eye damage/irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity			
No	**Substance name**	**CAS no.**	**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**	**471-480-0**
Type of examination		in vitro gene mutation study in bacteria	
Species		S. typhimurium TA 1535, TA 1537, TA 98 and TA 100	

Method	JAPAN: Guidelines for Screening Mutagenicity Testing Of Chemicals
Evaluation/classification	Based on available data, the classification criteria are not met.

Reproduction toxicity			
No	**Substance name**	**CAS no.**	**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**	**471-480-0**

Type of examination	Two-Generation Reproduction Toxicity Study
Species	rats (male/female)
Method	OECD 416
Source	ECHA
Evaluation/classification	Based on available data, the classification criteria are not met.

Carcinogenicity
No data available

STOT - single exposure
No data available

STOT - repeated exposure			
No	**Substance name**	**CAS no.**	**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**	**471-480-0**

Route of exposure	inhalational		
NOEC		5000	ppm
Species	rats (male/female)		
Method	OECD 413		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		

Aspiration hazard
No data available

11.2 Information on other hazards

Endocrine disrupting properties
No data available

Other information
No data available.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish (acute)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**		**471-480-0**
LC50	>	117		mg/l
Duration of exposure		96		h
Species	Cyprinus carpio			
Method	OECD 203			
Source	ECHA			

Toxicity to fish (chronic)
No data available

Toxicity to Daphnia (acute)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**		**471-480-0**
EC50	>	160		mg/l
Duration of exposure		48		h
Species	Daphnia magna			
Method	OECD 202			
Source	ECHA			

Toxicity to Daphnia (chronic)
No data available

Toxicity to algae (acute)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**		**471-480-0**
EC50		> 170		mg/l
Duration of exposure		72		h
Species		Raphidocelis subcapitata		
Method		OECD 201		
Source		ECHA		

Toxicity to algae (chronic)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**		**471-480-0**
NOEC		170		mg/l
Duration of exposure		72		h
Species		Raphidocelis subcapitata		
Method		OECD 201		
Source		ECHA		

Bacteria toxicity
No data available

12.2 Persistence and degradability

Biodegradability				
No	**Substance name**	**CAS no.**		**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**		**471-480-0**
Type		aerobic biodegradation		
Value		0		%
Method		OECD 301 D		
Source		ECHA		
Evaluation/classification		Not readily biodegradable		

12.3 Bioaccumulative potential

Partition coefficient n-octanol/water (log value)			
No	**Substance name**	**CAS no.**	**EC no.**
1	**(1E)-1,3,3,3-tetrafluoroprop-1-ene**	**29118-24-9**	**471-480-0**
log Pow		1,6	
Source		ECHA	

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	
Product Name	
R 1234ze	
PBT assessment	The product is not considered to be a PBT.
vPvB assessment	The product is not considered to be a vPvB.
Source	ECHA

12.6 Endocrine disrupting properties

No data available.

12.7 Other adverse effects

Other adverse effects
Global warming potential (GWP): 1.37

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company.
dispose of in accordance with local regulation.

Packaging
Containers must be completely emptied and disposed of in accordance with the legal requirements. Containers that have not been emptied must be taken to the disposal site after consultation with the disposal company.

SECTION 14: Transport information

14.1 UN number or ID number

ADR/RID/ADN	UN3163
IMDG	UN3163
ICAO-TI / IATA	UN3163

14.2 UN proper shipping name

ADR/RID/ADN	LIQUEFIED GAS, N.O.S.
Technical name	(1E)-1,3,3,3-tetrafluoroprop-1-ene
IMDG	LIQUEFIED GAS, N.O.S.
Technical name	(1E)-1,3,3,3-tetrafluoroprop-1-ene
ICAO-TI / IATA	Liquefied gas, n.o.s.
Technical name	(1E)-1,3,3,3-tetrafluoroprop-1-ene

14.3 Transport hazard class(es)

ADR/RID/ADN - Class	2
Label	2.2 RID: (+13)
Classification code	2A
Tunnel restriction code	C/E
Hazard identification no.	20
IMDG - Class	2.2
Label	2.2
ICAO-TI / IATA - Class	2.2
Label	2.2

14.4 Packing group

ADR/RID/ADN	-
IMDG	-
ICAO-TI / IATA	-

14.5 Environmental hazards

EmS	F-C, S-V

14.6 Special precautions for user

To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

14.7 Maritime transport in bulk according to IMO instruments

Not relevant

SECTION 15: Regulatory information

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

EU regulations

Regulation (EC) No 1907/2006 (REACH) Annex XIV (List of substances subject to authorisation)

In accordance with the REACH regulation (EC) 1907/2006, the product does not contain any substances that are considered as subject to listing in annex XIV, inventory of substances requiring authorisation.

REACH candidate list of substances of very high concern (SVHC) for authorisation

In accordance with article 57 and article 59 of the Reach regulation (EC) 1907/2006, this substance is not considered as subject to listing in annex XIV, inventory of substances requiring authorisation ("Authorization list").

Regulation (EC) No 1907/2006 (REACH) Annex XVII: RESTRICTIONS ON THE MANUFACTURE, PLACING ON THE MARKET AND USE OF CERTAIN DANGEROUS SUBSTANCES, MIXTURES AND ARTICLES

The substance is not subject to the provisions of annex XVII (restriction entries) of the Reach regulation (EC) 1907/2006.

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances

This substance is not subject to Part 1 or 2 of Annex I

Other regulations

REGULATION (EU) No 2024/573 on fluorinated greenhouse gases
Adhere to the national sanitary and occupational safety regulations when using this product.

National regulations

Water Hazard Class (Germany)

Class	1
Identification number	9699
Source	Classification according to AwSV (Regulation on facilities for handling substances that are hazardous to water).

Other regulations

REGULATION (EU) No. 517/2014 on fluorinated greenhouse gases; Take into account: TRGS 510 "Storage of hazardous substances in non-stationary containers"

15.2 Chemical safety assessment

A chemical safety assessment has been carried out for this substance.

CAS no.	29118-24-9
EC no.	471-480-0

SECTION 16: Other information

Sources of key data used to compile the data sheet:
Regulation (EC) No 1907/2006 (REACH), 1272/2008 (CLP) as amended in each case.
Directives 2000/39/EC, 2006/15/EC, 2009/161/EU, (EU) 2017/164.
National Threshold Limit Values of the corresponding countries as amended in each case.
Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.
The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding section.

Classification information
This product is assessed and classified using the methods and criteria below referred to in Article 9 of Regulation (EC) n° 1272/2008:
Physical hazards: determined through assessment data based on the methods or standards referred to in part 2 of Annex I to CLP
Health hazards and environmental hazards: determined through toxicological and ecotoxicological assessment data based on the methods or standards referred to in Part 3 and 4 of Annex I to CLP.

Creation of the safety data sheet
UMCO GmbH

This information is based on our present knowledge and experience.
The safety data sheet describes products with a view to safety requirements.
It does not however, constitute a guarantee for any specific product properties and shall not establish a legally valid contractual relationship.

This document is an English translation of the legally compliant safety data sheet of the region Germany. This document, including UFI and emergency telephone number, may only be used for placing on the market in the region Germany.

Prod-ID 812991