

# Safety Data Sheet

## Tetrafluoromethane (R14)

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

SDS Reference Number: D-CF4-116

Issue date: 6/25/2015 Revision date: 12/15/2025 Supersedes version of: 8/29/2023 Version: 0.6

### Warning



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

### 1.1. Product identifier

Trade name	:	Tetrafluoromethane (R14)
SDS no	:	D-CF4-116
Other means of identification	:	Tetrafluoromethane (R14)
	CAS-No.	: 75-73-0
	EC-No.	: 200-896-5
	EC Index-No.	: ---
REACH registration No	:	01-2120751230-69
Chemical formula	:	CF4

### 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. Chemical reaction / Synthesis. Laboratory use. Use as refrigerant. Use for manufacture of electronic/photovoltaic components.
Uses advised against	:	Consumer use. Uses other than those listed above are not supported, contact your supplier for more information on other uses.

### 1.3. Details of the supplier of the safety data sheet

Messer Industriegase GmbH  
Messer- Platz 1  
D - 65812 Bad Soden am Taunus  
Germany  
T +49 (0) 6196 7760-200, F +49 (0) 6196 7760-280  
[SDB.de@messergroup.com](mailto:SDB.de@messergroup.com), [www.messer.de](http://www.messer.de)

### 1.4. Emergency telephone number

Emergency telephone number	:	Messer Produktionsgesellschaft mbH Salzgitter, +49 (0) 5341 21-9333, erreichbar Montags 0:00 bis Sonntags 24:00
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- Skin contact : Adverse effects not expected from this product.  
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.  
See 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.  
Product does not burn, use fire control measures appropriate for the surrounding fire.
- 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 : Carbonyl fluoride. Carbon monoxide. Hydrogen 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.  
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.  
Standard EN 469 - Protective clothing for firefighters. Standard EN 659 - Protective gloves for firefighters.  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel : Act in accordance with local emergency plan.  
Try to stop release.  
Evacuate area.  
Ensure adequate air ventilation.  
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.  
Stay upwind.  
See section 8 of the SDS for more information on personal protective equipment.
- For emergency responders : Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.  
Oxygen detectors should be used when asphyxiating gases may be released.  
See section 5.3 of the SDS for more information.

#### 6.2. Environmental precautions

Try to stop release.

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

Ventilate area.

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

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Safe handling of the gas receptacle : Protect containers from physical damage; do not drag, roll, slide or drop.  
Refer to supplier's container handling instructions.  
Do not allow backfeed into the container.  
When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.  
Leave valve protection caps, when provided, 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.  
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

Keep container below 50°C in a well ventilated place.  
Stored containers should be periodically checked for general condition and leakage.  
Observe all regulations and local requirements regarding storage of containers.  
Containers should not be stored in conditions likely to encourage corrosion.  
Containers should be stored in the vertical position and properly secured to prevent them from falling over.  
Container valve guards or caps, when provided, should be in 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

OEL (Occupational Exposure Limits) : None available.  
DNEL (Derived-No Effect Level) : None established.  
PNEC (Predicted No-Effect Concentration) : None established.

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### 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.  
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.

Standard EN ISO 16321-1 - Eye and face protection for occupational use Part 1: General requirements.

• Skin protection

- Hand protection

: Wear working gloves when handling gas containers.

Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher. Recommended types include wrist gloves from leather or synthetic material with equivalent performance, fabric gloves, fabric gloves with leather palms.

Standard EN 511 - Cold insulating gloves, performance level 1 or higher. Recommended types include insulated gauntlets or gloves specifically selected to prevent liquid penetration and ingress of cryogenic liquids and to provide mechanical resistance.

- Other

: Wear safety shoes while handling containers.

Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• Respiratory protection

: Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.

Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

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.

## 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

: No odour warning properties. Odourless.

Melting point / Freezing point

: -184 °C

Boiling point

: -128 °C

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Flammability	: Non flammable.
Lower explosion limit	: Non flammable.
Upper explosion limit	: Non flammable.
Flash point	: Not applicable for gases and gas mixtures.
Auto-ignition temperature	: Non flammable.
Decomposition temperature	: Not applicable.
pH	: Not applicable for gases and gas mixtures.
Viscosity, kinematic	: Not applicable for gases and gas mixtures.
Water solubility [20°C]	: 20 mg/l
Partition coefficient n-octanol/water (Log Kow)	: 1.18
Vapour pressure [20°C]	: Not applicable.
Vapour pressure [50°C]	: Not applicable.
Density and/or relative density	: Not applicable for gases and gas mixtures.
Relative vapour density (air=1)	: 3
Particle characteristics	: Not applicable for gases and gas mixtures. Nanoforms are not relevant for gases and gas mixtures.

### **9.2. Other information**

#### **9.2.1. Information with regard to physical hazard classes**

Flammability properties	: Non flammable.
Oxidising properties	: No oxidising properties.
Tci	: Non flammable.
Critical temperature [°C]	: -45 °C

#### **9.2.2. Other safety characteristics**

Molar mass	: 88 g/mol
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.

### **10.5. Incompatible materials**

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

<b>Acute toxicity</b>	: No toxicological effects from this product.
<b>Skin corrosion/irritation</b>	: No known effects from this product.
<b>Serious eye damage/irritation</b>	: No known effects from this product.
<b>Respiratory or skin sensitisation</b>	: No known effects from this product.
<b>Germ cell mutagenicity</b>	: No known effects from this product.
<b>Carcinogenicity</b>	: No known effects from this product.
<b>Toxic for reproduction : Fertility</b>	: No known effects from this product.
<b>Toxic for reproduction : unborn child</b>	: No known effects from this product.
<b>STOT-single exposure</b>	: No known effects from this product.
<b>Target organ(s)</b>	: Cardiovascular system. Respiratory system.
<b>STOT-repeated exposure</b>	: No known effects from this product.
<b>Aspiration hazard</b>	: Not applicable for gases and gas mixtures.

### 11.2. Information on other hazards

Other information : The substance/mixture has no endocrine disrupting properties.

## SECTION 12: Ecological information

### 12.1. Toxicity

Assessment	: No ecological damage caused by this product.
EC50 48h - Daphnia magna [mg/l]	: No data available.
EC50 72h - Algae [mg/l]	: No data available.
LC50 96 h - Fish [mg/l]	: No data available.

### 12.2. Persistence and degradability

Assessment : No data available.

### 12.3. Bioaccumulative potential

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

### 12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

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### **12.6. Endocrine disrupting properties**

Assessment : The substance/mixture has no endocrine disrupting properties.

### **12.7. Other adverse effects**

Other adverse effects : No known effects from this product.  
Effect on the ozone layer : No effect on the ozone layer.  
Global warming potential [CO<sub>2</sub>=1] : 7390  
Effect on global warming : When discharged in large quantities may contribute to the greenhouse effect.  
Contains fluorinated greenhouse gases listed in Regulation 2024/573.  
For quantities refer to cylinder label.

## **SECTION 13: Disposal considerations**

### **13.1. Waste treatment methods**

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

In accordance with ADR / RID / IMDG / IATA / ADN  
UN-No. : 1982

### **14.2. UN proper shipping name**

**Transport by road/rail/inland waterways (ADR/RID/ADN)** : TETRAFLUOROMETHANE (REFRIGERANT GAS R 14)  
**Transport by air (ICAO-TI / IATA-DGR)** : Refrigerant gas R 14  
**Transport by sea (IMDG)** : TETRAFLUOROMETHANE (REFRIGERANT GAS R 14)

### **14.3. Transport hazard class(es)**

Labelling :



2.2 : Non flammable, non-toxic gases.

### Transport by road/rail/inland waterways

#### (ADR/RID/ADN)

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

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

Class / Div. (Sub. risk(s))	: 2.2
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### 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/inland waterways (ADR/RID/ADN)	: Not applicable.
Transport by air (ICAO-TI / IATA-DGR)	: Not applicable.
Transport by sea (IMDG)	: Not applicable.

#### 14.5. Environmental hazards

Transport by road/rail/inland waterways (ADR/RID/ADN)	: 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/inland waterways (ADR/RID/ADN)	: 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.
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#### 14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

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### SECTION 15: Regulatory information

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

##### EU-Regulations

- Restrictions on use : None.
- Other information, restriction and prohibition regulations : (EU) 2024/573 : on fluorinated greenhouse gases and repealing Regulation (EC) No 517/2014.  
Not listed on the PIC list (Regulation EU 649/2012).  
Not listed on the POP list (Regulation EU 2019/1021).
- Seveso Directive : 2012/18/EU (Seveso III) : Not covered.

##### National regulations

- Water hazard class (WGK) : 1 - Slightly hazardous to water.
- Regulatory reference : National / local legislations :  
Law on the Protection of Young People at Work (Jugendarbeitsschutzgesetz-JArbSchG)  
Ordinance on Industrial Safety and Health (BetrSichV)  
TRBS 3145/TRGS 745 - Transportable pressurized gas containers - Filling, holding, internal transport, emptying  
TRGS 510 - Storage of hazardous substances in transportable containers  
TRGS 407 - Activities with gases - Risk assessment  
TRBS 2141 - Hazards due to steam and pressure - General requirements  
The Ordinance on Installations for the Handling of Substances Hazardous to Water (AwSV)  
Storage class according to TRGS 510: 2A Gases (without aerosol dispensers and lighters)  
Technical Instructions on Air Quality Control (TA Luft).  
Classification for storage according to TRGS 510: 2A Gase (ohne Aerosolpackungen und Feuerzeuge).  
TA Luft.

#### 15.2. Chemical safety assessment

A CSA has not yet been carried out.

### SECTION 16: Other information

- Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 2020/878.

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### 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 - 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.
- UFI : Unique Formula Identifier.

### Training advice

- : The hazard of asphyxiation is often overlooked and must be stressed during operator training. For more guidance, refer to EIGA SL 01 "Dangers of Asphyxiation", downloadable at <http://www.eiga.eu>.

### Further information

- : Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP).  
 Key literature references and sources of data are maintained in EIGA Doc 169 : 'Classification and Labelling Guide', downloadable at <http://www.Eiga.eu>.

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.

**End of document**