

Safety data sheet Silicon tetrafluoride

Creation date : 28.01.2005
Revision date : 15.09.2011

Version : 1.2

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

1.1. Product identifier

Product name
Silicon tetrafluoride

EC No (from EINECS): 232-015-5
CAS No: 7783-61-1
Index-Nr.

Chemical formula SiF₄
REACH Registration number:
Not available.

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

Relevant identified uses
Industrial and professional. Perform risk assessment prior to use.
Uses advised against
Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification
BOC, PO Box 1201, Bluebell, Dublin
E-Mail Address ReachSDS@boc.com

1.4. Emergency telephone number
Emergency phone numbers (24h): 1850 333 435

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification acc. to Regulation (EC) No 1272/2008/EC (CLP/GHS)

Press. Gas (Liquefied gas) - Contains gas under pressure; may explode if heated.
Acute Tox. 2 - Fatal if inhaled.
Skin Corr. 1A - Causes severe skin burns and eye damage.
EUH071 - Corrosive to the respiratory tract.

Classification acc. to Directive 67/548/EEC & 1999/45/EC:

Proposed by the industry
T; R23 | C; R35
Toxic by inhalation.
Causes severe burns (eyes, respiratory system and skin).

Risk advice to man and the environment

Liquefied gas.

2.2. Label elements

- Labelling Pictograms



- Signal word

Danger

- Hazard Statements

H280 Contains gas under pressure; may explode if heated.
H330 Fatal if inhaled.
H314 Causes severe skin burns and eye damage.
EUH071 Corrosive to the respiratory tract.

- Precautionary Statements

Precautionary Statement Prevention

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P260 Do not breathe gas, vapours.

Precautionary Statement Response

P304+P340+P315 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice/attention.
P303+P361+P353+P315 IF ON SKIN (or hair): Remove / Take off immediately all contaminated clothes. Rinse skin with water/shower. Get immediate medical advice/attention.
P305+P351+P338+P315 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

Precautionary Statement Storage

P403 Store in a well-ventilated place.
P405 Store locked up.

Precautionary Statement Disposal

None.

2.3. Other hazards

Contact with liquid may cause cold burns/frost bite.

SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

3.1. Substances

Silicon tetrafluoride
CAS No: 7783-61-1
Index-Nr.:
EC No (from EINECS): 232-015-5
REACH Registration number:

Not available.
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

First Aid General Information:

Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

First Aid Inhalation:

Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

First Aid Skin / Eye:

Remove contaminated clothing. Drench affected area with water for at least 15 minutes. In case of skin contact, wearing rubber gloves rub 2.5% calcium gluconate gel continuously into the affected area for 1.5 hours or until further medical care is available. Immediately flush eyes thoroughly with water for at least 15 minutes. Alternatively irrigate eyes intermittently for 20 minutes with an

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aqueous Calcium gluconate 1% solution if available. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.

First Aid Ingestion:

Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

Prolonged exposure to small concentrations may result in pulmonary oedema. May cause severe chemical burns to cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product. Delayed adverse effects possible.

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

Treat with a corticosteroid spray as soon as possible after inhalation. Obtain medical assistance.

SECTION 5: Fire fighting measures

5.1. Extinguishing media

Suitable extinguishing media

Carbon dioxide. Dry powder. Foam. Use water spray or fog to control fire fumes.

Unsuitable extinguishing media

Do not use a solid water stream.

5.2. Special hazards arising from the substance or mixture

Specific hazards

Exposure to fire may cause containers to rupture/explode.

Hazardous combustion products

None that are more toxic than the product itself. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Silicon oxides
Hydrogen fluoride.

5.3. Advice for fire-fighters

Specific methods

If possible, stop flow of product. Move container away or cool with water from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.

Special protective equipment for fire-fighters

Gas tight chemically protective clothing (Type 1) in combination with self contained breathing apparatus.

Guideline:

EN 943-2:2002: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Performance requirements for gas-tight (Type 1) chemical protective suits for emergency teams (ET).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Use self-contained breathing apparatus and chemically protective clothing. Ensure adequate air ventilation. Monitor concentration of released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. EN 137 Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — Requirements, testing, marking.

6.2. Environmental precautions

Try to stop release. Reduce vapour with fog or fine water spray.

6.3. Methods and material for containment and cleaning up

Ventilate area. Wash contaminated equipment or sites of leaks with copious quantities of water. Hose down area with water.

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Only experienced and properly instructed persons should handle gases under pressure. The substance must be handled in accordance with good industrial hygiene and safety procedures. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Avoid exposure, obtain special instructions before use. Do not smoke while handling product. Ensure the complete gas system has been (or is regularly) checked for leaks before use. Installation of a cross purge assembly between the container and the regulator is recommended. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Avoid suckback of water, acid and alkalis. Refer to supplier's handling instructions. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Do not allow backfeed into the container. 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 container valve discontinue use and contact supplier. Protect containers from physical damage; do not drag, roll, slide or drop. 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 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 container contents.

7.2. Conditions for safe storage, including any incompatibilities

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

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

PNEC not available.
DNEL not available
No occupational exposure limit.

8.2. Exposure controls

Appropriate engineering controls

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and

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to select the PPE that matches the relevant risk. The following recommendations should be considered. Product to be handled in a closed system and under strictly controlled conditions. Preferably use permanent leak-tight connections (eg. welded pipes). Systems under pressure should be regularly checked for leakages. Gas detectors should be used when toxic quantities may be released. Provide adequate general or local ventilation. Consider work permit system e.g. for maintenance activities.

Personal protective equipment

Eye and face protection

Protect eyes, face and skin from liquid splashes. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Wear a face-shield when transfilling and breaking transfer connections. Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Full-face mask recommended

Guideline:

EN 136 Respiratory protective devices. Full face masks. Requirements, testing, marking

Skin protection

Hand protection

Advice: Wear working gloves and safety shoes while handling containers., Chemically resistant gloves complying with EN 374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Guideline: EN 374-1/2/3 Protective gloves against chemicals and micro-organisms.

Body protection

Protect eyes, face and skin from contact with product. Keep suitable chemically resistant protective clothing readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.

Guideline:

EN 943: Protective clothing against liquid and gaseous chemicals, including liquid aerosols and solid particles.

Other protection

Wear working gloves and safety shoes while handling containers. EN ISO 20345 Personal protective equipment - Safety footwear.

Respiratory protection

Keep self contained breathing apparatus readily available for emergency use., Use SCBA in the event of high concentrations, The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD., When allowed by a risk assessment a supplied air respirator may be used.

Guideline:

EN 136 Respiratory protective devices. Full face masks. Requirements, testing, marking

Guideline:

EN 137 Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — Requirements, testing, marking.

Thermal hazards

If there is a risk of contact with the liquid, all protective equipment should be suitable for extremely low temperatures.

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

General information

Appearance/Colour: Colourless gas. Gives off white fumes in moist air.

Odour: Pungent

Odour threshold:

Odour threshold is subjective and inadequate to warn for over exposure.

pH value: If dissolved in water pH-value will be affected.

Melting point: -86,8 °C

Boiling point: -95,2 °C

Flash point: Not applicable for gases and gas mixtures.

Evaporation rate:

Not applicable for gases and gas mixtures.

Flammability range: Non flammable.

Vapour Pressure 20 °C: Not applicable.

Relative density, gas: 3,6

Solubility in water: Hydrolyses.

Partition coefficient: n-octanol/water:

Not applicable.

Autoignition temperature: Not applicable.

Molecular weight: 104 g/mol

Sublimation point: -95,2 °C

Critical temperature: -14,1 °C

Relative density, liquid: Not known.

9.2. Other information

Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

Unreactive under normal conditions.

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

Reacts with most metals in the presence of moisture, liberating hydrogen, an extremely flammable gas. With water causes rapid corrosion of some metals. Moisture. Reacts with water to form corrosive acids. May react violently with alkalis. For material compatibility see latest version of ISO-11114.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Silicon oxides
Hydrogen fluoride.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute oral toxicity

No data available.

Acute inhalation toxicity

Value: LC50

Species: Rat

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Exposure time: 4 h
Value in non-standard unit: 225 ppm
Absorption of excessive F- can result in acute systemic fluorosis with hypocalcaemia interference with various metabolic functions and organ damage (heart, liver, kidneys).

Acute dermal toxicity

No data available.

Skin irritation

Corrosive.

Eye irritation

No known effects from this product.

Sensitization

No known effects from this product.

Repeated dose toxicity

No data available.

Assessment mutagenicity

No known effects from this product.

Assessment carcinogenicity

No evidence of carcinogenic effects.

Assessment toxicity to reproduction

No known effects from this product.

Assessment teratogenicity

No known effects from this product.

Specific Target Organ Toxicity (STOT) - Single Exposure

May cause nausea and irritation of the respiratory tract. Hydrolysis of silanes in the body forms silicic acid or hydrated silica.

Specific Target Organ Toxicity (STOT) - Repeated Exposure

Organ: Liver

Damage to central nervous system., Causes damage to the cardiovascular system.

Aspiration hazard

Not applicable to gases and gas mixtures

SECTION 12: Ecological information

12.1. Toxicity

No data available. May cause pH changes in aqueous ecological systems.

12.2. Persistence and degradability

No data available.

12.3. Bioaccumulative potential

No data available.

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

No data available.

12.6. Other adverse effects

No data available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Must not be discharged to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. 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.

Gases in pressure containers (including halons) containing dangerous substances

EWC Nr. 16 05 04*

SECTION 14: Transport information

ADR/RID

14.1. UN number

1859

14.2. UN proper shipping name

Silicon tetrafluoride

14.3. Transport hazard class(es)

Class: 2

Classification Code: 2TC

Labels: 2.3, 8

Hazard number: 268

Tunnel restriction code: (C/D)

Emergency Action Code: 2PE

14.4. Packing group (Packing Instruction)

P200

14.5. Environmental hazards

None.

14.6. Special precautions for user

None.

IMDG

14.1. UN number

1859

14.2. UN proper shipping name

Silicon tetrafluoride

14.3. Transport hazard class(es)

Class: 2.3

Labels: 2.3, 8

EmS: F-C, S-U

14.4. Packing group (Packing Instruction)

P200

14.5. Environmental hazards

None.

14.6. Special precautions for user

None.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

IATA

14.5. Environmental hazards

None.

14.6. Special precautions for user

None.

Other transport information

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 that they are firmly secured. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that

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the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations. Ensure that the container valve is closed and not leaking.

SECTION 15: Regulatory information

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

Seveso Directive 96/82/EC: Covered

Other regulations

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work
Directive 89/686/EEC on personal protective equipment

Council Directive 67/548/EEC on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances

Directive 1999/45/EC concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations

Directive 97/23/EC on the approximation of the laws of the Member States concerning pressure equipment.

15.2. Chemical safety assessment

CSA has not been carried out.

SECTION 16: Other information

Ensure all national/local regulations are observed. Ensure operators understand the toxicity hazard. Users of breathing apparatus must be trained. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

Advice

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. Details given in this document are believed to be correct at the time of going to press.

Further information

Note:

When using this document care should be taken, as the decimal sign and its position complies with rules for the structure and drafting of international standards, and is a comma on the line.

As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

References

Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:

Agency for Toxic Substances and Diseases Registry (ATSDR)
(<http://www.atsdr.cdc.gov/>)

European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.

European Chemical Agency: Information on Registered Substances
<http://apps.echa.europa.eu/registered/registered-sub.aspx#search>
European Industrial Gases Association (EIGA) Doc. 169/11
Classification and Labelling guide.

ISO 10156:2010 Gases and gas mixtures -- Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.

International Programme on Chemical Safety
(<http://www.inchem.org/>)

Matheson Gas Data Book, 7th Edition.

National Institute for Standards and Technology (NIST) Standard Reference Database Number 69

The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (<http://ecb.jrc.ec.europa.eu/esis/>).

The European Chemical Industry Council (CEFIC) ERICards.

United States of America's National Library of Medicine's toxicology data network TOXNET (<http://toxnet.nlm.nih.gov/index.html>)

Substance specific information from suppliers.

2010 Code of Practice for the Safety, Health and Welfare at Work (S.I. No. 619 of 2001).

End of document