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.: 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, Priestley Road, Worsley, Manchester M28 2UT
E-Mail Address ReachSDS@boc.com

1.4. Emergency telephone number

Emergency phone numbers (24h): 0800 111 333

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.: 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
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 e.g. 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 contaminates 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
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 (e.g. 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 transferring 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.

Skin protection

Requirements, testing, marking

Skin protection

Requirements, testing, marking

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.

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
React with 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
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
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
Management of Health and Safety at Work Regulations (1999 No. 3242)
The Regulatory Reform (Fire Safety) Order 2005 (2005 No. 1541)
Control of Substances Hazardous to Health Regulations (COSHH, 2002 No. 2877)
Provision and Use of Work Equipment Regulations (PUWER, 1998 No. 2306)
Personal Protective Equipment Regulations (1992 No. 2966)
Control of Major Accident Hazards Regulations (COMAH, 1999 No. 743)
Chemical Hazards Information and Packaging for Supply (CHIP, 1994 No. 3247)
Pressure Systems Safety Regulations (PER, 2000 No. 128)

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 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/)

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.
Substance specific information from suppliers.
EH40 (as ammended) Workplace exposure limits.

End of document