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

1.1. Product identifier

| | |
|----------------------|-----------------------|
| Trade name | Silicon tetrafluoride |
| Chemical description | Silicon tetrafluoride |
| CAS N° | 7783-61-1 |
| CE N° | 232-015-5 |
| Index N° | -- |
| Registration n° | 01-2120762243-59 |
| Chemical formula | SiF ₄ |

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

| | |
|--------------------------|--|
| Relevant identified uses | Industrial and professional Test gas/Calibration gas Chemical reaction / Synthesis Use for manufacture of electronic/photovoltaic components Laboratory use Contact supplier for more information on uses |
| Uses advised against | For use by industrial and professional users only |

1.3. Details of the supplier of the safety data sheet

| | |
|------------------------|---|
| Company identification | MULTIGAS Route de l'Industrie 102 CH-1564 Domdidier |
| Phone number | +41 (0) 26 676 94 94 |
| E-mail address | info@multigas.ch |

1.4. Emergency telephone numbers


145 (Toxicology Centre Zurich) or +41 (0) 44 251 51 51
 +41 (0) 26 676 94 94 (Multigas)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

| | |
|--|------|
| Gases under pressure : Liquefied gas | H280 |
| Skin corrosion/irritation, Category 1A | H314 |




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| | |
|---|------|
| Serious eye damage/eye irritation, Category 1 | H318 |
| Acute toxicity (inhalation: gas) Category 2 | H330 |

For the complete H-sentences texts mentioned in that chapter, refer to Section 16


2.2. Label elements

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

| | |
|---------------------------------|--|
| Hazard pictograms |    |
| | GHS04 GHS05 GHS06 |
| Signal word | Danger |
| Hazard statements | |
| H280 | Contains gas under pressure; may explode if heated |
| H314 | Causes severe skin burns and eye damage |
| H318 | Causes serious eye damage |
| H330 | Fatal if inhaled |
| EUH014 | Reacts violently with water |
| EUH029 | Contact with water liberates toxic gas |
| EUH071 | Corrosive to the respiratory tract |
| Precautionary statements | |
| P260 | Do not breathe gas, vapours |
| P280 | Wear protective gloves, protective clothing, eye protection, face protection |
| P303+P361+P353+P315 | IF ON SKIN: (or hair) Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Get immediate medical advice / attention |
| 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 |
| 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 |
| P410+403 | Protect from sunlight. Store in a well-ventilated place |
| P405 | Store locked up |

2.3. Other hazards

A powerful release of hydrogen fluoride; tear gas

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SECTION 3: Composition/information on ingredients

3.1. Substances

| Name | Product identifier | Concentration | Classification |
|-----------------------|---|---------------|--|
| Silicon tetrafluoride | (CAS-No.) 7783-61-1 (EC-No.) 232-015-5 (EC Index-No.) --- (Registration-No.) 01-2120762243-59 | 100% | Press. Gas (Liq.), H280 Acute Tox. 2 (Inhalation: gas), H330 Skin Corr. 1A, H314 Eye Dam. 1, H318 |

For the complete H-sentences texts mentioned in that chapter, refer to Section 16

Contains no other components or impurities which will influence the classification of the product

3.2. Mixtures

Not established

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice

See a doctor. Show this safety data sheet to the attending physician
Hydrofluoric acid burns require emergency medical assistance. Symptoms may not appear until 24 hours later, depending on the concentration of hydrofluoric acid. Following decontamination with water, more serious damage may occur due to the penetration or absorption of the fluoride ion
The treatment should have for the purpose of binding the fluoride ion and to combat the effects of exposure. Exposed skin can be treated with a 2.5% calcium gluconate gel, repeated application, until the burning sensation ceases

More serious skin contact may require the use of subcutaneous calcium gluconate except in the finger area - unless the doctor has experience with this method - because of the risk of tissue damage caused by the increase in pressure

Absorption can easily occur through the subungual regions, which should be taken into account during decontamination. In an attempt to prevent the absorption of fluoride ion, if swallowed, give conscious victim milk or give him chewable tablets of calcium carbonate or milk of magnesia. Potential conditions, such as hypocalcemia, hypomagnesemia and cardiac arrhythmia, should be controlled as they are likely to occur following exposure to the product

In case of inhalation


In case of inhalation, remove the person from the contaminated area. In case of respiratory arrest, give artificial respiration. See a doctor

In case of skin contact

Remove contaminated clothing and shoes immediately. Wash with soap and plenty of water. Take victim immediately to hospital. See a doctor
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

In case of eyes contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a doctor

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In case of ingestion

Ingestion is not considered a possible route of exposure

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

May cause severe chemical burns to skin and cornea

Prolonged exposure to small concentrations may result in pulmonary oedema.

Delayed adverse effects possible.

Material is destructive to tissue of the mucous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea

Refer to section 11

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

No data available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

Carbon dioxide, dry chemical agents, dry powder

Unsuitable extinguishing media

Do not use water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards

In case of fire or excessive heat, hazardous combustion products may be produced

Exposure to fire may cause containers to rupture/explode

Hazardous combustion products

In case of fire or excessive heat, hazardous combustion products may be produced such as : hydrogen fluoride

5.3. Additional information

Cool endangered receptacles with water spray jet from a protected position

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid breathing vapours, spray mists or gases


Provide adequate ventilation

Evacuate personnel to a safe place

Personal protective equipment, see section 8

6.2. Environmental precautions

Try to stop the leak

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6.3. Methods and material for containment and cleaning up

Ventilate the area
 Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost)

6.4. Reference to other sections

See also sections 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid contact with skin and eyes. Avoid breathing vapour or mist
 Keep away from sources of ignition - No smoking
 For precautions, see section 2.2

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool place. Keep container tightly closed in a dry and well-ventilated place
 Never allow the product to come into contact with water during storage
 Content under pressure

7.3. Specific end use(s)

None

SECTION 8: Exposure controls/personal protection

8.1. Control parameters


Components with occupational exposure limits

| Component | CAS N° | Exposure value type | Control parameter | Source |
|-----------------------|-----------|---------------------|-------------------|--------------------------------------|
| Silicon tetrafluoride | 7783-61-1 | TWA | - | No occupational exposure limit value |
| | | | - | |
| | | OEL | - | |
| | | | - | |

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation
 Gas detectors should be used when flammable / toxic gases / vapours are likely to be released

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8.2.2. Individual protection measures, e.g. personal protective equipment

| | |
|-------------------------------|---|
| Eye/face protection | Wear goggles and a face shield when transfilling or breaking transfer connections. Standard EN 166 |
| Skin / hand protection | <p>Wear protective gloves when handling gas cylinders. Standard EN 388- Protective gloves against mechanical hazards Wear cold insulating gloves when transferring or disconnecting transfer lines Standard EN 511 - Insulating gloves against cold Wearing chemical resistant gloves Standard EN 374-Protective gloves against chemicals</p> <p>For long-term use Material: Fluoroelastomer Glove thickness: 0.7 mm Penetration time: 480 min</p> <p>For short-term use Material: Nitrile rubber Glove thickness: 0.4 mm Penetration time: 60 min</p> <p>Have appropriate, chemical-resistant protective clothing ready for use in emergencies</p> |
| Respiratory protection | When the risk assessment shows that the use of respirable respirators is appropriate, use a full face mask with EN 14387 multipurpose cartridge. If the mask is the only means of protection, use a full face respirator. Use NIOSH (US) or CEN (EU) tested and approved equipment |

8.2.3. Environmental exposure controls

-

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 | Acre |
| Odour threshold | No data available |
| pH | No data available |
| Melting point / Freezing point | -90.2°C |
| Boiling point | -86°C |
| Flash point | No data available |
| Evaporation rate | No data available |
| Flammability (solid, gas) | No data available |
| Explosive limits | No data available |
| Vapour pressure [25°C] | No reliable data available |

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| | |
|--|-------------------|
| Vapour pressure [50°C] | No data available |
| Vapour density | No data available |
| Relative density, liquid (water=1) | No data available |
| Relative density, gas (air=1) | 3.57 |
| Water solubility | 41.13 g/l |
| Partition coefficient n-octanol/water (Log Kow) | No data available |
| Auto-ignition temperature | No data available |
| Decomposition temperature | No data available |
| Viscosity | No data available |
| Explosive properties | No data available |
| Oxidising properties | No data available |

9.2. Other information

| | |
|---------------------------|---|
| Molar mass | 104.06 g/mol |
| Critical temperature [°C] | -14.1°C |
| Relative vapour density | 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 recommended storage conditions

10.3. Possibility of hazardous reactions


Reacts violently with water

10.4. Conditions to avoid

 Avoid moisture in installation systems
 Reacts violently with glass

10.5. Incompatible materials

 Water, calcium oxide, oxidants, acids, bases, alcohols, glass
 Reacts with most metals in the presence of moisture, liberating hydrogen,
 an extremely flammable gas
 For additional information on compatibility refer to ISO 11114

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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. Chemical safety assessment

| | |
|---|--|
| Acute toxicity | Fatal if inhaled Absorption of excessive fluorides can result in acute systemic fluorosis with hypocalcaemia, interference with various metabolic functions and organ damage (heart, liver, kidneys) Delayed fatal pulmonary oedema possible |
| Skin corrosion/irritation | Causes severe skin burns and eye damage |
| Serious eye damage/irritation | Causes serious eye damage |
| Respiratory or skin sensitisation | No data available |
| Germ cell mutagenicity | No data available |
| Carcinogenicity | No data available |
| Reproductive toxicity | No data available |
| STOT-single exposure – Target organ(s) | Severe corrosion to the respiratory tract at high concentrations May cause nausea and irritation of the respiratory tract. Hydrolysis of silanes in the body forms silicic acid or hydrated silica |
| STOT-repeated exposure | No data available |
| Ingestion hazard | No data available |

11.2 Additional information

Fluoride ion can lower serum calcium levels, which can lead to fatal hypocalcaemia

The product is extremely destructive to the tissues of the mucous membranes, upper respiratory tract, eyes and skin. spasm, inflammation and oedema of the larynx, spasm, inflammation and oedema of the bronchi, pulmonary congestion, pulmonary oedema, burning sensation, coughing, asthma, laryngitis, respiratory insufficiency, migraine, nausea

To our knowledge, the chemical, physical and toxicological properties have not been fully studied


SECTION 12: Ecological information

12.1. Toxicity

| | |
|-------------------|-------------------|
| Assessment | No data available |
|-------------------|-------------------|

12.2. Persistence and degradability

No data available

| | | |
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12.3. Bioaccumulative potential

No data available

12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

PBT / vPvB assessment is not available because the chemical safety assessment is not required / is not conducted

12.6. Endocrine disrupting properties

No data available

12.7. Other adverse effects

Contains fluorinated greenhouse gas(es)
 May contribute to the greenhouse effect when discharged in large quantities
 Can change the pH of aquatic ecosystems

SECTION 13: Disposal considerations


13.1. Waste treatment methods

| | |
|-------------------------------|---|
| Product | Must not be released into the atmosphere Burn in a chemical incinerator equipped with an afterburner and scrubber Return to the supplier the product not consumed in its original container |
| Contaminated container | Eliminate as unused product Contact the supplier if instructions are needed |
| OMoD Code | 16 05 04 Gases in pressure containers containing dangerous substances |

SECTION 14: Transport information

14.1. UN number

| Transport par road/rail ADR / RID | Transport by sea IMDG | Transport by air IATA |
|--------------------------------------|--------------------------|--------------------------|
| 1859 | 1859 | 1859 |

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14.2. UN proper shipping name

| Transport par road/rail ADR / RID | Transport by sea IMDG | Transport by air IATA |
|--------------------------------------|--------------------------|--------------------------|
| Silicon tetrafluoride | Silicon tetrafluoride | Silicon tetrafluoride |

14.3. Transport hazard class(es)

Labelling



ADR/RID
IMDG
IATA

2.3 : Toxic gases
8 : Corrosive substances

14.4. Packing group

ADR/RID
IMDG
IATA

Not established

14.5. Environmental hazards

ADR/RID

None

IMDG

None

ICAO-TI / IATA-DGR

None

14.6. Special precautions for user

No data available

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable


SECTION 15: Regulatory information

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

This safety data sheet complies with the requirements of Regulation (CE) No. 1907/2006

15.2. Chemical safety assessment

A CSA has not yet been carried out

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SECTION 16: Other information

| | |
|-----------------------------------|--|
| Indication of changes | Revised safety data sheet in accordance with commission regulation (EU) No 2015/830 |
| Abbreviations and acronyms | <p>ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road</p> <p>CAS : Chemical Abstract Service number (USA)</p> <p>CLP : Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008</p> <p>CSA : Chemical Safety Assessment</p> <p>EIGA : European Industrial Gases Association</p> <p>EINECS : European Inventory of Existing Commercial Chemical Substances</p> <p>EN : European Standard</p> <p>ATE : Acute Toxicity Estimate</p> <p>IATA : International Air Transport Association</p> <p>IMDG Code : International Maritime Dangerous Goods Code</p> <p>LC50 : Lethal Concentration to 50 % of a test population</p> <p>OMoD : Swiss Ordinance on the movement of waste</p> <p>PBT : Persistent, Bioaccumulative and Toxic</p> <p>PPE: Personal Protection Equipment</p> <p>REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006</p> <p>RID : Regulations concerning the international carriage of dangerous goods by rail</p> <p>RMM : Risk Management Measures</p> <p>STOT-SE : Specific Target Organ Toxicity - Single Exposure</p> <p>UN : United Nations</p> <p>vPvB : Very Persistent and Very Bioaccumulative</p> <p>WGK: Water Hazards Class</p> |


Full text of H, EUH and P statements used in sections 2 and 3

Hazard statements

| | |
|--------|--|
| H280 | Contains gas under pressure; may explode if heated |
| H314 | Causes severe skin burns and eye damage |
| H318 | Causes serious eye damage |
| H330 | Fatal if inhaled |
| EUH014 | Reacts violently with water |
| EUH029 | Contact with water liberates toxic gas |
| EUH071 | Corrosive to the respiratory tract |

Precautionary statements

| | |
|------|-----------------------------|
| P260 | Do not breathe gas, vapours |
|------|-----------------------------|

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| | |
|---------------------|---|
| P280 | Wear protective gloves, protective clothing, eye protection, face protection |
| P303+P361+P353+P315 | IF ON SKIN: (or hair) Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Get immediate medical advice / attention |
| P304+P340+P310+P315 | IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Consult a doctor immediately |
| 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 |
| P410+403 | Protect from sunlight. Store in a well-ventilated place |
| P405 | Store locked up |

Disclaimer of liability

Details given in this document have been prepared based on the most available reliable documents and are believed to be correct at the time of going to press
They do not claim to be exhaustive and should be considered as a guide