

SAFETY DATA SHEET
Silicon tetrachlorideIssue Date: 21.04.2015
Last revised date: 03.02.2017

Version: 1.0

SDS No.: 000010022851
1/13**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier**

Product name: Silicon tetrachloride

Additional identification

Chemical name: Silicon tetrachloride

Chemical formula: SiCl₄
INDEX No. 014-002-00-4
CAS-No. 10026-04-7
EC No. 233-054-0
REACH Registration No. 01-2119489367-22**1.2 Relevant identified uses of the substance or mixture and uses advised against**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****Supplier**Oy AGA Ab
Itsehallintokuja 6
FIN-02600 ESPOO Finland

Telephone: +358 10 2421

E-mail: info@fi.aga.com

1.4 Emergency telephone number: Poison Information Center: open 24 hours a day, tel. 09 471 977**SECTION 2: Hazards identification****2.1 Classification of the substance or mixture**

Classification according to Directive 67/548/EEC or 1999/45/EC as amended.

Xi; R36/37/38

The full text for all R-phrases is displayed in section 16.

Classification according to Regulation (EC) No 1272/2008 as amended.

Health Hazards

Acute toxicity (Oral)	Category 3	H301: Toxic if swallowed.
Acute toxicity (Dermal)	Category 3	H311: Toxic in contact with skin.
Acute toxicity (Inhalation - vapor)	Category 3	H331: Toxic if inhaled.
Serious eye damage	Category 1	H318: Causes serious eye damage.

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2.2 Label Elements

Contains: Silicon tetrachloride



Signal Words: Danger

Hazard Statement(s): H301+H311+H331: Toxic if swallowed, in contact with skin or if inhaled.
H318: Causes serious eye damage.

Precautionary Statement

Prevention: P261: Avoid breathing dust/fume/gas/mist/vapors/spray.
P264: Wash thoroughly after handling.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response: P301+P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P361+P364: Take off immediately all contaminated clothing and wash it before reuse.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P311: Call a POISON CENTER/doctor.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER/doctor/...

Storage: P403+P233: Store in a well-ventilated place. Keep container tightly closed.

Disposal: None.

Supplemental label information

EUH014: Reacts violently with water.

2.3 Other hazards: None.

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Chemical name	Silicon tetrachloride
INDEX No.:	014-002-00-4
CAS-No.:	10026-04-7
EC No.:	233-054-0
REACH Registration No.:	01-2119489367-22
Purity:	100%
	The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.
Trade name:	-

SECTION 4: First aid measures

General:	Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
4.1 Description of first aid measures	
Inhalation:	Move the exposed person to fresh air at once. If breathing stops, provide artificial respiration. Symptoms may include: Dizziness. Nausea, vomiting.
Eye contact:	Flush thoroughly with water. If irritation occurs, get medical assistance.
Skin Contact:	Promptly flush contaminated skin with soap or mild detergent and water. Promptly remove clothing if penetrated and flush the skin with water.
Ingestion:	Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs. Get medical attention immediately.
4.2 Most important symptoms and effects, both acute and delayed:	Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other severe central nervous system effects. Repeated exposure may cause skin dryness or cracking. May be fatal if inhaled. May be fatal if swallowed.
4.3 Indication of any immediate medical attention and special treatment needed	
Hazards:	Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other severe central nervous system effects. Repeated exposure may cause skin dryness or cracking. May be fatal if inhaled. May be fatal if swallowed.
Treatment:	Do not give direct mouth-to-mouth resuscitation if swallowed. To protect rescuer, use air-viva, oxy-viva or one-way mask. Resuscitate in a well-ventilated area. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. Treat with a corticosteroid spray as soon as possible after inhalation.

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SECTION 5: Firefighting measures

General Fire Hazards: Heat may cause the containers to explode.

5.1 Extinguishing media

Suitable extinguishing media: Use water spray to reduce vapors or divert vapor cloud drift. Water Spray or Fog. Dry powder. Foam. Carbon Dioxide.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

5.2 Special hazards arising from the substance or mixture: Fire or excessive heat may produce hazardous decomposition products.

5.3 Advice for firefighters

Special fire fighting procedures: In case of fire: Stop leak if safe to do so. Use of water may result in the formation of very toxic aqueous solutions. Keep run-off water out of sewers and water sources. Dike for water control. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.

Special protective equipment for fire-fighters: Gas tight chemically protective clothing (Type 1) in combination with self contained breathing apparatus.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: Evacuate area. Provide adequate ventilation. Monitor the concentration of the released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

6.2 Environmental Precautions: Prevent further leakage or spillage if safe to do so. Reduce vapour with fog or fine water spray. Keep run-off water out of sewers and water sources. Dike for water control.

6.3 Methods and material for containment and cleaning up: Provide adequate ventilation. Wash contaminated equipment or sites of leaks with copious quantities of water.

6.4 Reference to other sections: Refer to sections 8 and 13.

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SECTION 7: Handling and storage:

7.1 Precautions for safe handling: Do not handle until all safety precautions have been read and understood. Avoid exposure - obtain special instructions before use. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Keep container below 50°C in a well ventilated place. Avoid suckback of water, acid and alkalis. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a 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.

7.2 Conditions for safe storage, including any incompatibilities: Containers should not be stored in conditions likely to encourage corrosion. Keep away from food, drink and animal feeding stuffs. Stored containers should be periodically checked for general conditions and leakage. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

7.3 Specific end use(s): None.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

DNEL-Values

Critical component	type	Value	Remarks
Silicon tetrachloride	Worker - inhalative, long-term - systemic	85 mg/m3	-
	Worker - inhalative, short-term - systemic	85 mg/m3	-
	Worker - inhalative, long-term - local	9,3 mg/m3	-
	Worker - inhalative, short-term - local	9,3 mg/m3	-
	Worker - dermal, long-term - systemic	12,1 mg/kg bw/day	-
	Worker - dermal, short-term - systemic	12,1 mg/kg bw/day	-

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8.2 Exposure controls

Appropriate engineering controls:

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Provide adequate general and local exhaust ventilation. Keep concentrations well below occupational exposure limits. Gas detectors should be used when toxic quantities may be released. Systems under pressure should be regularly checked for leakages. Product to be handled in a closed system and under strictly controlled conditions. Only use permanent leak tight installations (e.g. welded pipes). Do not eat, drink or smoke when using the product.

Individual protection measures, such as personal protective equipment

General information:

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. Keep self contained breathing apparatus readily available for emergency use. 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. For waste disposal, see section 13 of the SDS. Protect eyes, face and skin from contact with product.

Eye/face protection:

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.

Skin protection

Hand Protection:

Wear working gloves while handling containers
Guideline: EN 388 Protective gloves against mechanical risks.
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:

No special precautions.

Other:

not applicable.

Respiratory Protection:

Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances. 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.

Thermal hazards:

not applicable.

Hygiene measures:

Obtain special instructions before use. Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

Environmental exposure controls:

For waste disposal, see section 13 of the SDS.

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Physical state:	liquid
Form:	liquid
Color:	Colorless clear
Odor:	Suffocating odor
Odor Threshold:	Odor threshold is subjective and is inadequate to warn of over exposure.
pH:	not applicable.
Freezing point:	-68,9 °C Experimental result, Key study
Boiling Point:	56,9 °C (1.013 hPa) Experimental result, Key study
Sublimation Point:	not applicable.
Critical Temp. (°C):	No data available.
Flash Point:	Not applicable to gases and gas mixtures.
Evaporation Rate:	Not applicable to gases and gas mixtures.
Flammability (solid, gas):	This product is not flammable.
Flammability Limit - Upper (%):	not applicable.
Flammability Limit - Lower (%):	not applicable.
Vapor pressure:	291,9 hPa (20 °C) Experimental result, Key study
Vapor density (air=1):	No data available.
Relative density:	1,52 (0 °C)
Solubility(ies)	
Solubility in Water:	No data available.
Partition coefficient (n-octanol/water):	Not known.
Autoignition Temperature:	> 650 °C Experimental result, Key study
Decomposition Temperature:	When heated to decomp, it emits toxic fumes of hydrogen chloride.

Viscosity

Kinematic viscosity:	0,35 mm ² /s (25 °C)
Dynamic viscosity:	No data available.
Explosive properties:	Not applicable.
Oxidizing properties:	not applicable.

9.2 Other information:

	None.
Molecular weight:	169,9 g/mol (SiCl ₄)
VOC Content:	EC Directive 1999/13: 1.000 g/l ~ 100 % (calculated) EC Directive 2004/42: 1.000 g/l ~ 100 % (calculated)

SECTION 10: Stability and reactivity**10.1 Reactivity:** No reactivity hazard other than the effects described in sub-section below.

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10.2 Chemical Stability:	Stable under normal conditions.
10.3 Possibility of hazardous reactions:	No data available.
10.4 Conditions to avoid:	No data available.
10.5 Incompatible Materials:	No data available.
10.6 Hazardous Decomposition Products:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

General information: None.

11.1 Information on toxicological effects

Acute toxicity - Oral Product

Toxic if swallowed.

Silicon tetrachloride LD 50 (Rat): 238 mg/kg Remarks: Experimental result, Key study

Acute toxicity - Dermal Product

Toxic in contact with skin.

Silicon tetrachloride LD 0 (Rabbit): > 10.000 mg/kg Remarks: Experimental result, Key study

Acute toxicity - Inhalation Product

Toxic if inhaled.

Silicon tetrachloride LC 50 (Rat, 1 h): 1312 ppm Remarks: Inhalation Experimental result, Key study

**Repeated dose toxicity
Silicon tetrachloride**

NOAEL (Rat(Female, Male), Oral, >= 28 d): 10 mg/kg Oral Read-across from supporting substance (structural analogue or surrogate), Key study
NOAEL (Rat(Female, Male), Inhalation): 10 ppm(m) Inhalation Read-across from supporting substance (structural analogue or surrogate), Key study

Skin Corrosion/Irritation Product

Based on available data, the classification criteria are not met.

Serious Eye Damage/Eye Irritation Product

Causes serious eye damage.

Respiratory or Skin Sensitization Product

Based on available data, the classification criteria are not met.

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Germ Cell Mutagenicity Product	Based on available data, the classification criteria are not met.
Carcinogenicity Product	Based on available data, the classification criteria are not met.
Reproductive toxicity Product	Based on available data, the classification criteria are not met.
Specific Target Organ Toxicity - Single Exposure Product	Based on available data, the classification criteria are not met.
Specific Target Organ Toxicity - Repeated Exposure Product	Based on available data, the classification criteria are not met.
Aspiration Hazard Product	No data available.

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity Product	No ecological damage caused by this product.
Acute toxicity - Fish Silicon tetrachloride	LC 50 (Danio rerio, 96 h): > 245 mg/l (semi-static) Remarks: Read-across from supporting substance (structural analogue or surrogate), Key study
Acute toxicity - Aquatic Invertebrates Silicon tetrachloride	EC 50 (Daphnia magna, 48 h): > 844 mg/l (Static) Remarks: Read-across from supporting substance (structural analogue or surrogate), Key study

**12.2 Persistence and Degradability
Product**

Not applicable to gases and gas mixtures..

**12.3 Bioaccumulative Potential
Product**

The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

**12.4 Mobility in Soil
Product**

Because of its high volatility, the product is unlikely to cause ground or water pollution.

**12.5 Results of PBT and vPvB
assessment
Product**

Not classified as PBT or vPvB.

12.6 Other Adverse Effects:

No ecological damage caused by this product.

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: Avoid discharges to atmosphere. Consult supplier for specific recommendations. Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Disposal methods: Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

SECTION 14: Transport information

ADR

14.1 UN Number: UN 1818
14.2 UN Proper Shipping Name: SILICON TETRACHLORIDE
14.3 Transport Hazard Class(es)
Class: 8
Label(s): 8
Hazard No. (ADR): X80
Tunnel restriction code: (E)
14.4 Packing Group: II
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -

RID

14.1 UN Number: UN 1818
14.2 UN Proper Shipping Name: SILICON TETRACHLORIDE
14.3 Transport Hazard Class(es)
Class: 8
Label(s): 8
14.4 Packing Group: II
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -

IMDG

14.1 UN Number: UN 1818
14.2 UN Proper Shipping Name: SILICON TETRACHLORIDE
14.3 Transport Hazard Class(es)
Class: 8
Label(s): 8
EmS No.: F-A, S-B
14.3 Packing Group: II
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -

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IATA

14.1 UN Number: UN 1818
14.2 Proper Shipping Name: Silicon tetrachloride
14.3 Transport Hazard Class(es):
Class: 8
Label(s): 8
14.4 Packing Group: II
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -
Other information
Passenger and cargo aircraft: Forbidden.
Cargo aircraft only: Forbidden.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: not applicable

Additional identification: 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 container valve is closed and not leaking. Ensure adequate air ventilation.

SECTION 15: Regulatory information

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

EU Regulations

Directive 96/61/EC: concerning integrated pollution prevention and control (IPPC): Article 15, European Pollution Emission Registry (EPER):

Chemical name	CAS-No.	Concentration
Silicon tetrachloride	10026-04-7	100%

Directive 96/82/EC (Seveso III): on the control of major accident hazards involving dangerous substances:

Chemical name	CAS-No.	Concentration
Silicon tetrachloride	10026-04-7	100%

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:

Chemical name	CAS-No.	Concentration
Silicon tetrachloride	10026-04-7	100%

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12/13**National 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 Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.

This Safety Data Sheet has been produced to comply with Regulation (EU) 453/2010.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Revision Information: Not relevant.

Key literature references and sources for data: 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 Classification and Labelling guide.
- International Programme on Chemical Safety (<http://www.inchem.org/>)
- ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
- Matheson Gas Data Book, 7th Edition.
- National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.
- The ESIS (European chemical Substances 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>)
- Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
- Substance specific information from suppliers.
- Details given in this document are believed to be correct at the time of publication.

Wording of the R-phrases and H-statements in section 2 and 3

H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
R14	Reacts violently with water.
R36/37/38	Irritating to eyes, respiratory system and skin.

Training information: Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard.

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Acute Tox. 3, H301
Acute Tox. 3, H311
Acute Tox. 3, H331
Eye Dam. 1, H318

Other information:

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. 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.

Last revised date:

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Disclaimer:

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.