

# Silicon

[Identification](#) | [Characterisation](#) | [Formula](#) | [Physical and chemical properties](#) |  
[Toxicology / Ecotoxicology](#) | [Safe handling](#) | [Regulations](#) | [Links](#) | [Literature register](#)

## IDENTIFICATION

### Silicon

**ZVG No:** 8110  
**CAS No:** 7440-21-3  
**EC No:** 231-130-8

## CHARACTERISATION

### SUBSTANCE GROUP CODE

133950 Semimetals

### STATE OF AGGREGATION

The substance is solid.

### PROPERTIES

powder  
dark gray to black  
odourless

### CHEMICAL CHARACTERISATION

in very finely distributed form combustible substance, poorly flammable.  
Only the amorphous powder is flammable.  
The substance is non-flammable in compact form.  
Practically insoluble in water.

[Substance information in Wikipedia](#)

### DUST EXPLOSIVENESS

There is a risk of a dust explosion if the following conditions are met:

- The substance is given in very finely distributed form (powder, dust).
- The substance is whirled up in sufficient quantity in the air.
- An ignition source is present (flame, spark, electrostatic discharge, etc.)

Quelle: 06806

## FORMULA

Si

**Molar mass:** 28,09 g/mol

## PHYSICAL AND CHEMICAL PROPERTIES

[Melting point](#) | [Boiling point](#) | [Density](#) | [Ignition temperature](#) | [Explosion data](#) | [Solubility](#) | [Hazardous reactions](#)

### MELTING POINT

Melting point: 1410 °C

Reference: [01221](#)

### BOILING POINT

Boiling Point: 3265 °C

Reference: [00501](#)

### DENSITY

DENSITY

Value: 2,33 g/cm<sup>3</sup>

Temperature: 25 °C

Reference: [01221](#)

### IGNITION TEMPERATURE

Ignition temperature: 490 °C

Reference: [00105](#)

### EXPLOSION DATA

Lower explosion limit:

80 g/m<sup>3</sup>

Reference: [01301](#)

### SOLUBILITY IN WATER

practically insoluble in water

Reference: [01301](#)

### HAZARDOUS REACTIONS

**Hazardous chemical reactions**

Risk of explosion in contact with:  
iridium hexafluoride (heat)  
osmium hexafluoride

The substance can react dangerously with:  
fluorine  
oxidizing agents  
bases  
water  
alkali carbonates (heat)  
barium peroxide  
lead oxide  
bromine trifluoride  
caesium acetylide  
calcium (heat)  
chlorine/heat  
cobalt(III)-fluoride (heat)  
difluorine oxide  
iodine pentafluoride  
potassium/sodium  
hot lyes  
manganese fluoride  
nitrosyl fluoride  
performic acid  
rubidium acetylide  
silver fluoride  
water (finely dispersed, reactive type or heat)

## TOXICOLOGY / ECOTOXICOLOGY

### TOXICOLOGICAL DATA

#### LD50 oral rat

Value: 3160 mg/kg

FAO Nutrition Meetings Report Series. Vol. 53A, Pg. 21, 1974.

Reference: [02071](#)

## SAFE HANDLING

[Handling](#) | [Storage](#) | [Fire and explosion protection](#) | [Personal protection](#) | [Disposal considerations](#) | [Accidental release measures](#) | [Fire fighting measures](#)

### TECHNICAL MEASURES - HANDLING

#### Workplace

Select ventilation measures according to the other used substances.

If there is a chance that dusts may be released, then the work room must provide adequate ventilation.

Washing facility at the workplace required.

#### Equipment

Use closed apparatus if possible.

Suction off dust at the point of exit.

Consider emission limit values, a purification of waste gases if necessary.

#### Advice on safer handling

Do not leave container open.

Sufficient ventilation must be guaranteed for refilling, transfer, or open use.

Avoid rising dust.

### **Cleaning and maintenance**

Avoid dust formation. Dust formation that cannot be avoided must be collected regularly.

Use a tested industrial vacuum cleaner or suction device.

Do not raise dust while cleaning.

Use tested industrial vacuum cleaners or suction systems for areas with a high risk of explosion.

Alternative: clean damp.

## **TECHNICAL MEASURES - STORAGE**

### **Storage**

Do not use any food containers - risk of mistake.

Containers have to be marked clearly and permanently.

Keep container tightly closed in a dry and well-ventilated place.

### **Conditions of collocated storage**

Storage class 10 - 13 (Other liquids and solids)

Only substances of the same storage class should be stored together.

Collocated storage with the following substances is prohibited:

- Pharmaceuticals, foods, and animal feeds including additives.
- Infectious, radioactive und explosive substances.
- Strongly oxidizing substances of storage class 5.1A.

Under certain conditions the collocated storage with the following sub-stances is permitted (For more details see [TRGS 510](#)):

- Gases.
- Flammable liquids of storage class 3.
- Other explosive substances of storage class 4.1A.
- Pyrophoric substances.
- Substances liberating flammable gases in contact with water.
- Oxidizing substances of storage class 5.1B.
- Ammonium nitrate and preparations containing ammonium nitrate.
- Organic peroxides and self reactive substances.
- Combustible and non combustible acutely toxic substances of storage classes 6.1A and 6.1B.

The substance should not be stored with substances with which hazardous chemical reactions are possible.

## **TECHNICAL MEASURES - FIRE AND EXPLOSION PROTECTION**

### **Technical, constructive measures**

Fire fighting equipment must be available.

If there is a risk of a dust explosion due to the dust-like distribution and the quantities used, measures according to [TRGS 722](#) (prevention of formation), 723 (prevention of ignition) and [TRGS 724](#) (constructive explosion protection) may become necessary.

### **Precaution on handling**

Areas in which the substance can arise as a dust in such quantities that a dust explosion could occur are to be considered as at a risk of explosion.

Keep away from sources of ignition (e.g. open flames, heat sources and sparks).

## **PERSONAL PROTECTION**

### **Body protection**

Wear an apron or a lab coat.

### **Respiratory protection**

In an emergency (e.g.: unintentional release of the substance) respiratory protection must be worn. Consider the maximum period for wear.

Respiratory protection: Particle filter P1, colour code white.

### **Eye protection**

Wear glasses with side protection.

### **Hand protection**

Select hand protection according to the other used substances.

### **Occupational hygiene**

Take heed of usual occupational hygiene measures when handling chemical substances, especially wash the skin with soap and water before breaks and at the end of work and apply fatty skin-care products after washing.

## **DISPOSAL CONSIDERATIONS**

Non-hazardous waste according to Waste Catalogue Ordinance (AVV).

If there is no way of recycling it must be disposed of in compliance with the respective national and local regulations.

Collection of small amounts of substance:

Collect in resistant, closed containers.

Collection vessels must be clearly labelled with a systematic description of their contents. Store the vessels in a well-ventilated location. Entrust them to the appropriate authorities for disposal.

## **ACCIDENTAL RELEASE MEASURES**

Wear a dust mask.

Pick up without creating dust.

Afterwards ventilate area and wash spill site.

Endangerment of watert:

No hazards to sources of water are to be feared if released into water, drainage, sewer, or the ground.

## **FIRE FIGHTING MEASURES**

### **Suitable extinguishing media**

Water (spray - not splash)

Alcohol resistant foam

Dry extinguishing powder

Carbon dioxide

### **Instructions**

Seek immediate cover in case of sudden release and raising of large quantities of dust.

If possible, take container out of dangerous zone.

Shut off sources of ignition.

### **Special protective equipment**

In the case of a fire hazardous substances can be released.

Silicon oxide

Wear self-contained breathing apparatus.

## **REGULATIONS**

## EUROPEAN GHS CLASSIFICATION AND LABELLING

Not a dangerous substance according to GHS.  
Registration entry of the manufacturer on the ECHA website

Reference: [07520](#)

State: 2021

Checked: 2021

## GERMAN WATER HAZARD CLASS

Substance No: 8653

non-hazardous to waters

Classification according to the announcement of the list of substances hazardous to water in the Federal Register of 10.08.2017, last update 24.11.2023

## TECHNICAL INSTRUCTIONS ON AIR QUALITY CONTROL ([TA LUFT](#))

Chapter 5.2.1 Overall Dust, including fine dust

The emissions of dust in the exhaust gas are not allowed to exceed the following values:

Mass flow: 0,20 kg/hr

or

Mass conc.: 20 mg/m<sup>3</sup>

The mass per unit volume of 0,15 g/m<sup>3</sup> in exhaust gas is not allowed to be exceeded also on observance or lower deviation of a mass flow of 0,20 kg/h.

## TRANSPORT REGULATIONS

Not subject to transport regulations.

Reference: [99999](#)

## TECHNICAL RULES FOR HAZARDOUS SUBSTANCES

### [TRGS 500](#)

Schutzmaßnahmen; Ausgabe September 2019

### [TRGS 509](#)

Lagern von flüssigen und festen Gefahrstoffen in ortsfesten Behältern sowie Füll- und Entleerstellen für ortsbewegliche Behälter; Ausgabe Juni 2022

### [TRGS 510](#)

Lagerung von Gefahrstoffen in ortsbeweglichen Behältern; Ausgabe Januar Dezember 2020

### [TRGS 800](#)

Brandschutzmaßnahmen; Ausgabe Dezember 2010

[TRGS 720](#)

Gefährliche explosionsfähige Gemische - Allgemeines; Ausgabe Juli 2020, zuletzt berichtigt März 2021

[TRGS 721](#)

Gefährliche explosionsfähige Gemische - Beurteilung der Explosionsgefährdung; Ausgabe Oktober 2020, zuletzt berichtigt Dezember 2020

[TRGS 722](#)

Vermeidung oder Einschränkung gefährlicher explosionsfähiger Atmosphäre, Ausgabe Februar 2021

[TRGS 723](#)

Gefährliche explosionsfähige Gemische - Vermeidung der Entzündung gefährlicher explosionsfähiger Gemische; Ausgabe Juli 2019, zuletzt geändert Oktober 2020

[TRGS 724](#)

Gefährliche explosionsfähige Gemische - Maßnahmen des konstruktiven Explosionsschutzes, welche die Auswirkung einer Explosion auf ein unbedenkliches Maß beschränken, Ausgabe Juli 2019

## **REGULATIONS OF GERMAN ACCIDENT INSURERS**

[DGUV Regel 112-190](#)

Benutzung von Atemschutzgeräten, Ausgabe November 2021  
(in German only)

## **LINKS**

[International Limit Values](#)

[DGUV Information 213-098: List of substances - lesson in schools \(in German only\)](#)

## **REFERENCES**

Quelle: 00001

IFA: Erfassungs- und Pflegehandbuch der GESTIS-Stoffdatenbank (nicht öffentlich)

Data acquisition and maintenance manual of the GESTIS substance database (non-public)

Quelle: 00105

Sorbe "Sicherheitstechnische Kenndaten chemischer Stoffe" ("Safety-related characteristics of chemical substances"), sicherheitsNet.de, Landsberg

Quelle: 00501

RÖMPP Online ab 2008

Quelle: 01221

GHS-Sicherheitsdatenblatt, Sigma-Aldrich

GHS Material Safety Data Sheet, Sigma-Aldrich

Quelle: 01231

GHS-Sicherheitsdatenblatt, Thermo Fisher Scientific

GHS Material Safety Data Sheet, Thermo Fisher Scientific

Quelle: 01301

GHS-Sicherheitsdatenblatt, Evonik

GHS Material Safety Data Sheet, Evonik

Quelle: 02071

Toxicological Data, compiled by the National Institute of Health (NIH), USA, selected and distributed by Technical Database Services (TDS), New York, 2009

Quelle: 05300

[TRGS 510](#) "Lagerung von Gefahrstoffen in ortsbeweglichen Behältern" Ausgabe Dezember 2020

Quelle: 06002

L. Roth, U. Weller

"Gefährliche Chemische Reaktionen" Loseblattsammlung mit Ergänzungslieferungen, ecomed-Verlag ("Dangerous chemical reactions" loose-leaf collection with supplement deliveries)

Quelle: 06806

GESTIS-STAU-EX-Datenbank des IFA [www.dguv.de/ifa/gestis-staub-ex](http://www.dguv.de/ifa/gestis-staub-ex)

Quelle: 07520

Europäische Chemikalienagentur ECHA: Informationen über registrierte Substanzen

European Chemicals Agency ECHA: Information on registered substances

Quelle: 07580

Bekanntmachung der Liste der wassergefährdenden Stoffe im Bundesanzeiger vom 10.08.2017, zuletzt geändert 24.11.2023

Quelle: 07635

AUERDATA 98

Quelle: 99999

Angabe des Bearbeiters

Indication of the editor

[Identification](#) | [Characterisation](#) | [Formula](#) | [Physical and chemical properties](#) |

[Toxicology / Ecotoxicology](#) | [Safe handling](#) | [Regulations](#) | [Links](#) | [Literature register](#)

**This material data sheet was carefully compiled. However no liability can be assumed for the data content, whatever the legal cause may be.**