

SILICON

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Identity: Silicon

NOTE: In the form in which this product is sold it is not regulated. This Material Safety Data Sheet is provided for information only.

Product Use: Silicon is used to make elements for infrared optical devices, and in solar arrays and panels to generate electricity.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	Approximate Percent by Weight	C.A.S. Number	Occupational Exposure Limits (OELs)	LD ₅₀ /LC ₅₀ Species & Route
Silicon	100	7440-21-3	OSHA PEL 15 mg/m ³ ACGIH TLV 10 mg/m ³	No Data

NOTE: OELs for individual jurisdictions may differ from OSHA PELs. Check with local authorities for the applicable OELs in your jurisdiction. OSHA – Occupational Safety and Health Administration; ACGIH – American Conference of Governmental Industrial Hygienists; OEL – Occupational Exposure Limit, PEL – Permissible Exposure Limit, TLV – Threshold Limit Value, REL – Recommended Exposure Limit.

Trade Names and Synonyms: None.

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: Silicon is relatively non-toxic and poses little immediate hazard to personnel or the environment in an emergency situation.

Potential Health Effects: Elemental silicon is relatively non-toxic to humans by all routes of exposure. No chronic health effects have been reported in humans occupationally exposed to silicon. It is not considered a human carcinogen by the OSHA, NTP, ACGIH, IARC or EU. (see Toxicological Information, Section 11).

Potential environmental Effects: Silicon has low toxicity and limited bioavailability in the environment. It poses no immediate ecological risk. However, contamination of soil and water should be prevented. (see Ecological Information, Section 12)

SECTION 4. FIRST AID MEASURES

Eye Contact: Flush with warm, running water including under the eyelids, to remove foreign object. If irritation persists, seek medical attention.

Skin Contact: Remove contaminated clothing and wash affected area with soap and warm water.

Inhalation: Remove victim from exposure area to fresh air immediately. If breathing has stopped, give artificial respiration. Medical oxygen may be administered, if available, where breathing is difficult. Seek immediate medical attention.

Ingestion: If victim is conscious, dilute stomach contents with 2-4 cupfuls of water or milk. Do not induce vomiting. Seek medical attention immediately and bring a copy of this MSDS. Never give anything by mouth to an unconscious person.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Elemental silicon is flammable when exposed to flame or by chemical reaction with oxidizing agents. May have a violent reaction with alkali carbonates; oxidants; (Al+PbO); Ca; CsC₂; CaF₂; F₂; IF₃; MnF₃; Rb₂C₂; FNO; AgF; and NaK alloy. When heated, it will react with water or steam to produce hydrogen gas.

Extinguishing Media: Flammable solid in powdered form. If involved in fire, do not use water, CO₂, or halogenated extinguishing agents. Use dry chemical extinguishing agents, dry sand, or dry ground dolomite.

Fire Fighting: No special firefighting procedures needed. Use normal procedures which include wearing NIOSH/MSHA approved self-contained breathing apparatus, flame and chemical resistant clothing; hats, boots and gloves. If without risk, remove material from fire area. Cool container with water from maximum distance. Fumes from fire are hazardous. Isolate runoff to prevent environmental pollution.

Flashpoint and Method: Not Applicable

Upper and Lower Flammable Limit: Not Applicable

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible to do so safely. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection and using method which will minimize dust generation (e.g., vacuum solids, dampen material and shovel or wet sweep). Return uncontaminated spilled material to the process if possible. Place contaminated materials in suitable labeled containers for recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Personal Precautions: Protective clothing, gloves, and respirator equipment are recommended for persons exposed to potentially hazardous levels of silicon dust. Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with the dust.

Environmental Precautions: Silicon is considered to have low toxicity. However, there is limited information on the effects and fate of silicon in the environment. Good management practices should be applied in the storage and use of silicon and its compounds.

SECTION 7. HANDLING AND STORAGE

Store silicon in a dry, covered area away from incompatible materials and protect from physical damage. Solid metal suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath, otherwise residual moisture could expand explosively and spatter molten material out of the bath. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands in appropriate, designated areas before eating, drinking, or smoking. No special packaging materials are required.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Clothing: Gloves and coveralls or other work clothing are recommended to prevent prolonged or repeated direct skin contact when silicon is processed. Eye protection should be worn. Where hot or molten material is handled, heat resistant gloves, goggles or faceshield, and clothing to protect from hot material splash should be worn. Safety type boots are recommended.

Ventilation: Use adequate local or general ventilation to maintain the concentration at or below the PEL, TLV. Mechanical exhaust is recommended.

Respirators: Where dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R, or P-95 particulate filter cartridge).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Steel gray pieces	Odor: None	Physical State Solid	pH Not Applicable
Vapor Pressure: 1 mm at 1724°C	Vapor Density: Not Applicable	Boiling Point/Range: 2355-2600°C	Freezing/Melting Point Range: 1410-1420°C
Specific Gravity: 2.33 gm/cc	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Not Applicable	Odor Threshold: None
Solubility: Insoluble in water			

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Stable under normal temperatures and pressures.

Incompatibilities: Alkali carbonates, (Al+PbO), Ca, Cs₂C₂, Cl₂, CoF₂, F₂, IF₃, MnF₃, Rb₂C₂, FNO, AgF, NaK alloy, water and steam.

Hazardous Decomposition Products: Hydrogen gas.

SECTION 11. TOXICOLOGICAL INFORMATION

General: To the best of our knowledge the chemical, physical and toxicological properties of silicon have not been thoroughly investigated and recorded.

Acute:

Skin/Eyes: Direct contact with skin or eyes may cause mild local mechanical irritation.

Inhalation: Inhalation of silicon dust may be irritating to the respiratory system. Symptoms may include coughing, sneezing and/or shortness of breath.

Ingestion: No acute health effects recorded.

Chronic: No chronic health effects recorded.

SECTION 12. ECOLOGICAL INFORMATION

As an element, silicon is insoluble and therefore, presents minimal environmental risk. However, little is known about the toxicity of silicon compounds and care should be taken to prevent environmental contamination.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process, dispose of only in accordance with applicable regulations.

Notice to Reader

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