

1. Identification of the Substance/Preparation and Company

Product name: **Silicon**

Application: Alloying into aluminum. Production of silicone (siloxanes) via $(\text{CH}_3)_2\text{SiCl}_2$.
Production of electronic grade silicon via HSiCl_3 .
Other industrial applications.

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2. Composition/Information on Ingredients

Synonyms/Trade names: Silicon Standard (Std), Silicon Refined (Ref.), Silgrain®, Silgrain® HQ, Jetmilled Silgrain®

IUPAC Name: Silicon

CAS No.: 7440-21-3

Symbols and indications of danger: None

R and S Phrases: None

Constituents (analysis):

	Weight%
Silicon (Si)	96 – 99
Iron (Fe)	0.03 – 1

3. Hazards Identification

The product does not represent a hazard to health, safety or environment when handled and stored as advised. See section 7.

Silicon-dust suspended in air may under certain conditions cause dust explosions. (See section 5)

Flammable and noxious gases may be formed in contact with moisture, acids or bases. (See Section 10 and 11)

4. First Aid Measures

INHALATION: Emergency Responders should use the appropriate respiratory protection when removing an affected victim to fresh air. Give artificial respiration if breathing has stopped. Call for prompt medical attention. (See Section 11)

SKIN CONTACT: Wash skin with water and/or mild detergent. If irritation develops, seek medical attention.

EYE CONTACT: Rinse eyes with large amounts of water/saline solution until no particles remain in eye. See a physician on persistent feeling of discomfort or if irritation occurs.

INGESTION: If large amounts are swallowed, get prompt medical attention.

5. Fire Fighting Measures

Extinguishing media: Dry sand, CO₂ or dry powder.

Lump silicon is not combustible. Dusts of silicon with particle diameter < 75 µm can be ignited and may propagate flame.

Silicon-dust suspended in air may under certain conditions cause dust explosions. See section 10.

6. Accidental Release Measures

Silicon Metal spilled on the land represents minimal hazard. Cleanup personnel should wear appropriate respiratory protective equipment when addressing fine material. Avoid the use of compressed air to maneuver spills or leaks of fine material. Fine material should be swept up or vacuumed using explosion-proof equipment. Keep dry material and wet material separated. Place cleaned up material in disposal container. Avoid repackaging wet materials in sealed containers.

7. Handling and Storage

Handling: Avoid handling that generates dust build-up. See section 8.
Avoid ignition sources (e.g. welding) in areas with high dust concentrations. Addition of wet material to molten metal may cause explosions. See section 10.

Storage: Keep product dry.

8. Exposure Controls/Personal Protection

A. Occupational exposure controls

Eye protection, eye flushing facilities and protective gloves are recommended. Ensure adequate ventilation. Wear an appropriate particulate respirator in accordance with 29 CFR 1910.134 or CSA Standard Z94.4-M1982 for dust exposure that may exceed exposure limits. If adequate ventilation is not possible, then a self-contained breathing apparatus or an air supplied respirator is recommended.

OCCUPATIONAL EXPOSURE LIMITS (OSHA and ACGIH):

	8hr TWA mg/m ³	
	OSHA PEL (1993)	ACGIH TLV (2008)
Particulates not otherwise regulated		
Total	15	
Respirable	5	
Particles Not Otherwise Specified (PNOS)		
Inhalable particles		10
Respirable particles		3

9. Physical and Chemical Properties

Structure	: Crystalline
Form	: Flour. Grain fractions (75-1500 µm).
Color	: Silvery, metallic material.
Odor	: Odorless.
Solubility (Water)	: Insoluble/slightly soluble.
Melting point (°C)	: Approx. 1410
Boiling point (°C)	: Approx. 2355
Specific density (water=1)	: Approx. 2.3

10. Stability and Reactivity

Silicon is insoluble in most acids, but dissolves in a mixture of hydrofluoric acid (HF) and nitric acid (HNO₃) evolving hazardous gases. Impurities present in silicon may react with dilute acids evolving hazardous gases (see below). Silicon dissolves readily in dilute lye.

Conditions to avoid:

Avoid generating sparks or other ignition sources (e.g. welding) in areas with high dust concentrations. Silicon-particles suspended in air at concentrations above 100 g/m³ can cause dust explosions. Both ignition sensitivity and the violence of explosion increase with decreasing particle size. Silicon dust with particle diameter > 40 µm probably entails no danger of explosion. Ignition temperature (warm surface) ≥ 800 °C.

Addition of wet material to molten metal may cause explosions.

Materials to avoid:

Acids (see below).

Hazardous decomposition products:

A reaction with hydrofluoric acid (HF) and nitric acid (HNO₃) leads to the formation of toxic gases such as silicon tetrafluoride (SiF₄) or nitrous gases (NO_x). Impurities in silicon may react with dilute acids forming flammable and harmful gases such as hydrogen (H₂) and silane (SiH₄).

Wet product will form flammable hydrogen gas if added to molten metal, due to decomposition of water.

11. Toxicological Information

Acute effects:

Inhalation:	Finely divided dust may irritate and dehydrate mucous membranes.
Skin contact:	Dust may irritate and dehydrate skin.
Eye contact:	Dust may irritate and lead to dryness.
Ingestion:	Dust may irritate and dehydrate mucous membranes.

Chronic effects: No chronic effects known. This material is not known to be a reproductive toxin, teratogen or mutagen.

12. Ecological Information

The product is not characterized as dangerous for the environment.

MOBILITY: The alloy has poor mobility under normal environmental conditions.
PERSISTENCE: Not relevant for metals.
BIOACCUMULATION: Not relevant, due to low mobility and non-dispersive use.
ECO-TOXICITY: LC₅₀/LD₅₀: Not determined. Hardly relevant for inorganic, insoluble substances.

13. Disposal Considerations

The material should be recovered for recycling if possible.
Dispose of in accordance with applicable federal, state, and local regulations. Silicon Metal is not a listed RCRA Hazardous Waste (40 CFR 261).

14. Transport Information

DOT (DEPARTMENT OF TRANSPORTATION):
Proper Shipping Name: Not regulated
Hazard Class: Not regulated
I.D. Number and Initials: Not regulated
Packing Group: Not regulated
Label(s): Not regulated

15. Regulatory Information

OSHA (Occupational Safety and Health Administration)
Hazardous by definition of hazardous communication standard (29 CFR 1910.1200)

TSCA (Toxic Substance Control Act):
Components of this product are listed on the TSCA Inventory.

CERCLA (Comprehensive Response Compensation, and Liability Act):
Silicon Metal is not listed in 40 CFR 302.4.

RCRA (Resource Conservation/Recovery Act):
Silicon Metal is not a listed hazardous waste.

SARA TITLE III (Superfund Amendments and Reauthorization Act):
311/312 Hazard Categories:
Immediate Health, Delayed Health, Fire.

313 Reportable Ingredients:
None

CALIFORNIA PROPOSITION 65:
This product contains chemical(s) known to the State of California to cause cancer:
None

CANADIAN WHMIS: D2B

16. Other Information

Literature references are available upon request to the manufacturer.