Doped Polycrystalline Silicon

In an emergency, call SUNEDISON at 363-474-5000

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Doped Polycrystalline Silicon – (Phosphorus, Boron)
Chemical Name: Silicon
Chemical Formula: Si
Synonyms: Polysilicon, Silicon
Company Name: SUNEDISON, Inc.
501 Pearl Drive
St Peters, MO 63376
636-474-5000

SECTION 2: HAZARDS IDENTIFICATION

OSHA Hazards: Respiratory system irritant
Chemical Name: Silicon
GHS Classification: Eye irritation (Category 2B)
Specific target organ toxicity - single exposure (Category 3)
GHS Label elements/precautionary statements:
Pictogram: Warning
Signal word: Causes eye irritation.
Hazard Statement(s) May cause respiratory irritation.
**Precautionary statement(s):**

- Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
- Wash skin thoroughly after handling.
- Use only outdoors or in a well-ventilated area.
- Wear protective gloves/ eye protection/ face protection.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- Call a POISON CENTER or doctor/ physician if you feel unwell.
- If eye irritation persists: Get medical attention.
- Store in a well-ventilated place. Keep container tightly closed.
- Store locked up.
- Dispose of contents/ container to an approved waste disposal plant.

**HMIS Classification:**

- Health hazard: 1
- Chronic Health Hazard: No data available
- Flammability: 0
- Physical hazards: 0

**NFPA Rating:**

- Health hazard: 1
- Fire: 0
- Reactivity: 0

**Potential Health Effects:**

- Inhalation - May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
- Skin - Harmful if absorbed through skin. Causes skin burns.
- Eyes - Causes eye burns.
- Ingestion - Harmful if swallowed.

**Note:**

Product contains inorganic arsenic that is not expected to be released during normal handling or processing. Arsenic content is not expected to create any additional health hazards.
Doped Polycrystalline Silicon

SECTION 3: COMPOSITION & INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>Contents</th>
<th>CAS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>&gt;99%</td>
<td>7740-21-3</td>
</tr>
<tr>
<td>Boron</td>
<td>&lt;1%</td>
<td>7440-42-8</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>&lt;1%</td>
<td>7723-14-0</td>
</tr>
</tbody>
</table>

SECTION 4: FIRST AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, give oxygen and seek medical attention.

Eye Contact: Flush with copious amounts of water for at least 15 minutes. If irritation persists, seek medical attention.

Skin Contact: Remove contaminated clothing. Wash affected area with soap and water. Rinse thoroughly. If irritation persists or other symptoms are observed, seek medical advice.

Ingestion: Rinse out mouth and drink copious amounts of water. In case of irritation or other symptoms, seek medical attention.

SECTION 5: FIRE FIGHTING MEASURES

Flammability Classification (Per 49 CFR Part 173 Subpart D): Material is not flammable according to definition of a flammable solid in 49 CFR, Part 173, Subpart D.

Known or Anticipated Hazardous Products of Combustion: None listed

Extinguishing Media: Use media suitable for surrounding fire. Dry chemical or carbon dioxide. In general, water based extinguishing media should not be used for this material.

Fire Fighting Instructions: Use firefighting measures which suit the environment and take into account other materials which may be involved. Wear self-contained breathing apparatus and protective clothing.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personnel Protection: Wear protective equipment including rubber gloves and eye protection. Ensure adequate ventilation. Keep unprotected personnel away.

Environmental Protection: Take precautions to ensure material does not contaminate the ground or enter the drainage system.

Cleanup/Collection: Ensure adequate ventilation. Avoid raising dust. Transfer material to sealed containers for disposal.
Doped Polycrystalline Silicon

SECTION 7: HANDLING AND STORAGE

Handling: Avoid contact with eyes, skin and clothing. Avoid generation of dust. Keep containers tightly sealed.

Storage: Store in a cool, dry location.

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS No.</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>7740-21-3</td>
<td>15 mg/m³ (total dust)</td>
<td>Not Established</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 mg/m³ (respirable dust)</td>
<td></td>
</tr>
<tr>
<td>Boron</td>
<td>7440-42-8</td>
<td>Not Established</td>
<td>Not Established</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>7723-14-0</td>
<td>Not Established</td>
<td>Not Established</td>
</tr>
</tbody>
</table>

Ventilation and Engineering Controls: Use general or local exhaust ventilation if necessary. Material transfer and dust collection equipment should be constructed of conductive materials and electrically interconnected (bonded) and grounded.

Respiratory Protection: Wear NIOSH (U.S,) or CEN (EU) approved dust respirator if exposure exceeds occupational exposure limit.

Eye Protection: Wear splash goggles or safety glasses.

Hand Protection: Wear chemical resistant gloves.

Body Protection: Use body protection appropriate for task. An apron or other impermeable body protection is suggested.

General Hygiene Measures: Keep away from foodstuffs, beverages and feed. Remove all soiled/contaminated clothing immediately. Wash hands before breaks and at the end of work. Avoid contact with eyes and skin.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Steel grey powder or crystals
Odor: Odorless
Physical state at atmospheric conditions: Solid
pH: Not applicable
Sublimation Temperature (at 1 atm): Not determined
Solubility in Water: Insoluble
Melting Point: 1410° C (2750° F)
Boiling Point: 2355° C (4271° F)
Specific gravity/Density: 2.33 g/cm³ at 20° C (68° F)
Doped Polycrystalline Silicon

**Molecular Weight:** 28.1 (silicon)
**Flammability:** Not applicable
**Flash Point:** Not applicable
**Flammability Limits in Air:** Not applicable
**Auto Ignition Temperature:** Not applicable

**SECTION 10: STABILITY AND REACTIVITY**

**Chemical Stability:** Stable
**Conditions to Avoid:** Avoid generation of airborne dusts. When heated, silicon will react with water to produce flammable and/or explosive hydrogen gas.
**Incompatibility with Other Materials:** Water, alkali metals, oxidizing agents, acids, basis, interhalogens, halogens.
**Hazardous Decomposition, Reaction and Oxidation (other than burning) Products:** Not known
**Hazardous Polymerization:** Will not occur.

**SECTION 11: TOXICOLOGICAL INFORMATION**

**RTECS Number:** VW0400000 (Silicon)
**Acute Toxicity:** Oral, LD50, 3160 mg/kg, rat
**Chronic and Subchronic Data:** Elementary silicon is an inert material that seems to have little adverse effect on lungs and does not appear to produce significant organic disease or toxic effects when exposures are kept under reasonable control.
**Special Studies:** None known to SUNEDISON Pasadena, Inc.
**Suspected cancer agent:** Silicon is not found on the following lists: FEDERAL OSHA Z LIST, IARC, NTP, and California and therefore is neither considered to be nor suspected to be a cancer-causing agent by these agencies.
**Irritancy of product:** Silicon is irritating to respiratory system.
**Sensitization of product:** Silicon is not known to be a sensitizer to humans upon prolonged or repeated contact.
**Reproductive toxicity information:** Listed below is information concerning the effects of Silicon on the human reproductive system;
**Mutagenicity:** No human mutagenic effects have been described for Silicon.
**Embryotoxicity:** No human embryotoxic effects have been described for Silicon.
Doped Polycrystalline Silicon

Teratogenicity: No human teratogenic effects have been described for Silicon.

Reproductive Toxicity: No human reproductive effects have been described for Silicon.

SECTION 12: ECOLOGICAL INFORMATION

Ecological Effects: Take care to prevent material from entering the ground, water courses, or drainage systems.

SECTION 13: DISPOSAL CONSIDERATIONS

Consult local, state or national regulations to endure proper disposal.

SECTION 14: TRANSPORTATION INFORMATION

This material is considered as non-hazardous and non-regulated as defined by 49 CFR 172 101.

SECTION 15: REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. Sara Reporting Requirements: Silicon is subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

<table>
<thead>
<tr>
<th>CHEMICAL NAME</th>
<th>SARA 302</th>
<th>SARA 304</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(40 CFR 355, Appendix A)</td>
<td>(40 CFR Table 302.4)</td>
<td>(40 CFR 372.65)</td>
</tr>
<tr>
<td>Silicon</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Boron</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Phosphorus</td>
<td>Yes</td>
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<td>Yes</td>
</tr>
</tbody>
</table>

OSHA Hazards: Target organ effect, irritant

U.S. SARA Threshold Planning Quantity: 100 lbs. (Phosphorus)

U.S. CERCLA Reportable Quantity (RQ): 1 lb. (Phosphorus)

U.S. TSCA Inventory Status: Silicon, phosphorus and boron are listed on the TSCA Inventory.

Other U.S. Federal Regulations: Silicon is not subject to the reporting requirements of CFR 29 1910.1000.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): These compounds are not on the California Proposition 65 list.

Pennsylvania Right To Know: Silicon, Boron, Phosphorus

New Jersey Right To Know: Silicon, Boron, Phosphorus

Canadian Regulatory Information: This product has been classified in accordance with the hazard criteria of the CPR, and the SDS contains all the information required by the CPR.

DSL – Yes, Silicon, Phosphorus, Boron  NDSL – No.

SECTION 16: OTHER INFORMATION

Disclaimer
SUNEDISON, Inc. cannot guarantee that these are the only hazards that exist. Users are solely responsible for the safe storage, handling, use and disposal of this material, and for compliance with the applicable laws, regulations and accepted practices. SUNEDISON, Inc. makes no representations or warranties; either expressed or implied, of merchantability, fitness for a particular purpose, or any other nature.