

# Material Safety Data Sheet

**Material:** Hyper Pure Silicon Wafers (polished, epitaxial and non-polished) for IC and discrete Semiconductor Applications

Version: 1.2 (US)      Date of print: 07/03/2006      Date of last alteration: 01/31/2006

## 1 Product and company identification

### 1.1 Identification of the substance or preparation:

**Commercial product name:** Hyper Pure Silicon Wafers (polished, epitaxial and non-polished) for IC and discrete Semiconductor Applications

**Use of substance / preparation:** Industrial. electronic

### 1.2 Company/undertaking identification:

**Manufacturer/distributor:** Siltronic AG  
Johannes-Hess-Straße 24  
84489 Burghausen  
Germany

**Customer information:** Siltronic Corporation  
7200 NW Front Avenue  
Portland, OR 97210  
USA

**Emergency telephone no. (24h):** (800) 424-9300  
**Transportation emergency:** -

This MSDS was prepared by the Regulatory Affairs and Product Safety Department (RAPS) of Wacker Chemical Corporation.

## 2 Composition/information on ingredients

### 2.1 Chemical characterization (substance):

CAS No.	Chemical characteristics
7440-21-3	Silicon

### 2.2 Information on ingredients:

Type	CAS No.	Substance	Content [wt. %]		Note
			Lower	Upper	
INHA	7440-21-3	Silicon	>=100.0	<=100.0	

**Type:** HYD - by-product upon hydrolysis, INHA - ingredient, NEBE - by-product, MONO - residual monomer, VERU - impurity, VUL - by-product upon vulcanization. \*\*\* **Note:** C1 - IARC carcinogen, C2 - NTP carcinogen, C3 - OSHA carcinogen, NH - non-hazardous, R - reproductive toxin.

This material does not contain any OSHA or WHMIS reportable hazardous ingredients. Due to the physical nature of this material, exposure to hazardous ingredients is not anticipated.

Substances listed in the Subsections "HAPS" and "California Proposition 65 Carcinogens / Reproductive Toxins" that are not listed in Section 2 are only present at quantities below 0.1% for California Proposition 65 listed toxins or below 1% for non-carcinogenic HAPS or they are inextricably bound in the product.

## 3 Hazards identification

### 3.1 Hazards classifications

**HMIS® rating (product as packaged):**

Health: 0      Fire: 1      Reactivity: 1      PPE: B

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Hazardous Materials Identification System and HMIS are registered trademarks of the National Paint and Coatings Association. (HMIS codes are based on contact with the product as packaged and any hydrolysis by-products, if present.)

**Canadian WHMIS Classification:** None.

### 3.2 Emergency overview and potential hazards

This material is an article under the Hazard Communication Standard 29 CFR 1910.1200. The hazards which are described in this MSDS apply only to those operations which may be conducted by the end user in order to alter or modify the product to fit their specific application, such as: cutting, grinding or drilling. This material is not hazardous under OSHA criteria. This material is not hazardous under WHMIS criteria.

**Physical Hazards:**

No known physical hazards.

**Acute health effects**

**Route of entry or possible contact:**

eyes , skin, inhalation (in case of dust formation) , ingestion

**Eye contact:**

No acute toxic effects are known. Slight irritation by mechanical effects is possible.

**Skin contact:**

No acute toxic effects are known. Slight irritation by mechanical effects can not be excluded.

**Inhalation:**

No acute toxic effects are expected. In case of dust formation: Respiratory tract irritation by mechanical effects can not be excluded.

**Ingestion:**

Not expected in industrial use.

**Additional information on acute health effects:**

odourless

### 3.3 Further information:

**Chronic health effects:**

none known

**Medical conditions which may be aggravated by exposure:**

unknown

**Carcinogens/Reproductive toxins:**

There are no carcinogenic ingredients present at or over 0.1% in this material. This material does not contain any reproductive toxins at or above OSHA or WHMIS reportable levels.

See Section 11 for Toxicological Information, if any.

## 4 First-aid measures

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### 4.1 General information:

First aid measures only apply to exposure to dust generated by mechanical operations. Get medical attention if irritation or other symptoms occur. Before seeking medical attention remove contaminated clothing and shoes. Take a copy of the Safety Data Sheet when going for medical treatment.

### 4.2 After inhalation:

In case of dust/aerosol formation: If inhaled, remove to fresh air.

### 4.3 After contact with the skin:

If contact with skin, wash skin with plenty of water or with water and soap.

### 4.4 After contact with the eyes:

If contact with eyes, immediately hold eyelids apart and flush with plenty of water for at least 15 min.

### 4.5 After swallowing:

For ingestion, if conscious, give several glasses of water but do not induce vomiting. If vomiting does occur, give additional fluids.

### 4.6 Advice for the physician:

Treat symptomatically.



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## 5 Fire-fighting measures

- 5.1 Flammable properties:** **Method**  
Flash point.....: not applicable  
Boiling point / boiling range.....: 2355 °C (4,271 °F)  
Lower explosion limit (LEL).....: not applicable  
Upper explosion limit (UEL).....: not applicable  
Ignition temperature .....: not applicable
- 5.2 Fire and explosion hazards:**  
Product can separate hydrogen in contact with lyes.
- 5.3 Recommended extinguishing media:**  
special powder for burning metals or dry sand .
- 5.4 Unsuitable extinguishing media:**  
water
- 5.5 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases:**  
Hazardous combustion products: silicon dioxide .
- 5.6 Fire fighting procedures:**  
Fire fighters should wear full protective clothing including a self-contained breathing apparatus. Cool endangered containers with water.

## 6 Accidental release measures

- 6.1 Precautions:**  
Wear personal protection equipment (see section 8).  
**HAZWOPER PPE Level:** D
- 6.2 Containment:**  
No special measures required.  
Spills of material which could reach surface waters must be reported to the United States Coast Guard National Response Center's toll free phone number (800) 424-8802.
- 6.3 Methods for cleaning up:**  
Take up mechanically and dispose of according to local/state/federal regulations.

## 7 Handling and storage

- 7.1 Handling**  
**Precautions for safe handling:**  
Keep container closed when not in use. Keep away from incompatible substances in accordance with section 10.2.  
**Precautions against fire and explosion:**  
Observe the general rules for fire prevention. Product can separate hydrogen in contact with lyes.
- 7.2 Storage**  
**Conditions for storage rooms and vessels:**  
none known  
**Advice for storage of incompatible materials:**  
Keep away from alkalis. Avoid contact with acids.  
**Further information for storage:**  
Keep container tightly closed.

## 8 Exposure controls and personal protection

- 8.1 Engineering controls**  
**Ventilation:**  
Use with adequate ventilation.  
**Local exhaust:**  
In case of dust formation: Local exhaust ventilation which meets the requirements of ANSI Z9.2 is recommended to control airborne contaminants at the point of use.

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**8.2 Associate substances with specific control parameters such as limit values**  
none known .

**8.3 Personal protection equipment (PPE)**  
**Respiratory protection:**  
 Respiratory protection is recommended for dust generating operations such as cutting, grinding, or drilling. A NIOSH approved air purifying respirator fitted with at least P-99 solid/aerosol particulate filters is recommended if overexposure to dust or aerosol mist could occur.  
**Hand protection:**  
 rubber gloves  
**Eye protection:**  
 Safety glasses with side shields.  
**Other protective clothing or equipment:**  
 Additional protective clothing or equipment is not normally required. Provide eye bath and safety shower.

**8.4 General hygiene and protection measures:**  
 When handling do not eat, drink, smoke or apply cosmetics. Wash thoroughly after handling.

<b>9 Physical and chemical properties</b>
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**9.1 Appearance**  
 Physical state / form.....: solid - compact  
 Colour.....: silver  
 Odour.....: odourless

<b>9.2 Safety parameters</b>	<b>Method</b>
Melting point / melting range.....: 1410 °C (2,570 °F)	
Boiling point / boiling range.....: 2355 °C (4,271 °F)	
Flash point.....: not applicable	
Ignition temperature .....: not applicable	
Lower explosion limit (LEL).....: not applicable	
Upper explosion limit (UEL).....: not applicable	
Vapour pressure.....: not applicable	
Density.....: approx. 2.32 g/cm <sup>3</sup>	
Water solubility / miscibility.....: virtually insoluble	
pH-Value.....: not applicable	
Viscosity (dynamic).....: not applicable	
Viscosity (kinematic).....: not applicable	

<b>10 Stability and reactivity</b>
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**10.0 General information:**  
 If stored and handled in accordance with standard industrial practices no hazardous reactions are known.

**10.1 Conditions to avoid:**  
 none known

**10.2 Materials to avoid:**  
 Reacts with: lyes . Reaction causes the formation of: hydrogen . Reacts with: strong oxidizing agents , acids .

**10.3 Hazardous decomposition products:**  
 If stored and handled in accordance with standard industrial practices and local regulations where applicable: none known .

**10.4 Further information:**  
 Hazardous polymerization cannot occur.  
 Conditions to avoid hazardous polymerization: odourless

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## 11 Toxicological information

- 11.1 **General information:**  
Toxicological testing has not been conducted with this material.
- 11.2 **Toxicological data:**
  - Experience with man:**  
By handling the product for many years no damage to health was observed.

## 12 Ecological information

- 12.1 **Information on elimination (persistence and degradability)**
  - Further information:**  
Insoluble in water. Separation by sedimentation.
- 12.2 **Behaviour in environmental compartments**
  - Mobility**  
Insoluble in water.
  - Further information:**  
No adverse effects expected.
- 12.3 **Ecotoxicological effects:**  
Non-toxic for organisms in water.
  - Effects in sewage treatment plants (bacteria toxicity: respiration-/reproduction inhibition):**  
According to current knowledge adverse effects on water purification plants are not expected.
- 12.4 **Additional information**
  - Other harmful effects**  
-
  - General information:**  
No environmental problems expected if handled and treated in accordance with standard industrial practices and local regulations where applicable.

## 13 Disposal considerations

- 13.1 **Product disposal**
  - Recommendation:**  
Observe local/state/federal regulations.
- 13.2 **Packaging disposal**
  - Recommendation:**  
Completely discharge containers (no tear drops, no powder rest, scraped carefully). Containers may be recycled or re-used. Observe local/state/federal regulations.

## 14 Transport information

- 14.1 **US DOT & CANADA TDG SURFACE**  
Valuation.....: Not regulated for transport
- 14.2 **Transport by sea IMDG-Code**  
Valuation.....: Not regulated for transport
- 14.3 **Air transport ICAO-TI/IATA-DGR**  
Valuation.....: Not regulated for transport

## 15 Regulatory information

- 15.1 **U.S. Federal regulations**



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**TSCA inventory status and TSCA information:**

This material or its components are listed on or are in compliance with the requirements of the TSCA Chemical Substance Inventory. This product is considered to be an article and is exempt from regulation.

**TSCA 12(b) Export Notification:**

This material does not contain any TSCA 12(b) regulated chemicals.

**CERCLA Regulated Chemicals:**

This material does not contain any CERCLA regulated chemicals.

**SARA 302 EHS Chemicals:**

This material does not contain any SARA extremely hazardous substances.

**SARA 311/312 Hazard Class:**

This product does not present any SARA 311/312 hazards.

**SARA 313 Chemicals:**

This material does not contain any SARA 313 chemicals above de minimus levels.

**HAPS (Hazardous Air Pollutants):**

This material does not contain any hazardous air pollutants.

## 15.2 U.S. State regulations

**California Proposition 65 Carcinogens:**

This material does not contain any chemicals known to the state of California to cause cancer.

**California Proposition 65 Reproductive Toxins:**

This material does not contain any chemicals known to the state of California to cause reproductive effects.

**Massachusetts Substance List:**

7440-21-3      Silicon

**New Jersey Right-to-Know Hazardous Substance List:**

7440-21-3      Silicon

**Pennsylvania Right-to-Know Hazardous Substance List:**

7440-21-3      Silicon

## 15.3 Canadian regulations

This product has been classified in accordance with the Hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

**WHMIS Hazard Classes:**

None.

**DSL Status:**

This material or its components are listed on the Canadian Domestic Substances List. This product is considered to be an article and is exempt from regulation.

**Non-DSL Chemicals:**

This material does not contain any non-DSL chemicals.

**Canadian Ingredient Disclosure List:**

This material contains no listed components.

## 15.4 Other international regulations

**EU Risk Phrases:**

R-Phrase	Description
R-	-

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**EU Safety Phrases:**

S-Phrase	Description
S-	-

**Details of international registration status**

Listed on the following inventories:

- IECSC - China
- ENCS - Japan
- PICCS - Philippines
- ECL - Korea
- AICS - Australia
- EINECS - Europe

**16 Other information**

**16.1 Additional information:**

This Material Safety Data Sheet (MSDS) meets the requirements of the Federal OSHA Hazard Communication Standard (29 CFR 1910.1200). This product has been classified according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR. This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief accurate and reliable as of the date compiled. However, no representation, warranty or guarantee expressed or implied, is made as to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information. Nothing herein shall be construed as a recommendation for uses which infringe valid patents or as extending a license under valid patents. This MSDS provides selected regulatory information on this product, including its components. This is not intended to include all regulations. It is the responsibility of the user to know and comply with all applicable rules, regulations and laws relating to the product being used.

**16.2 Glossary of Terms:**

- |   |  |
|---|--|
| ACGIH - American Conference of Governmental Industrial Hygienists | ppm - Parts per Million  |
| DOT - Department of Transportation                                | SARA - Superfund Amendments and Reauthorization Act                  |
| hPa - Hectopascals  | STEL - Short Term Exposure Limit                                     |
| mPa*s - Milli Pascal-Seconds                                      | TSCA - Toxic Substances Control Act                                  |
| OSHA - Occupational Safety and Health Administration              | TWA - Time Weighted Average  |
| PEL - Permissible Exposure Limit                                  | WHMIS - Canadian Workplace Hazardous Materials Identification System |

**Flash point determination methods**

- ASTM D56
- ASTM D92, DIN 51376, ISO 2592
- ASTM D93, DIN 51758, ISO 2719
- ASTM D3278, DIN 55680, ISO 3679
- DIN 51755

**Common name**

- Tagliabue (Tag) closed cup
- Cleveland open cup
- Pensky-Martens closed cup
- Setaflash or Rapid closed cup
- Abel-Pensky closed cup

**16.3 Conversion table:**

- Pressure: 1 hPa \* 0.75 = 1 mm Hg = 1 Torr; 1 bar = 1000 hPa
- Viscosity: 1 mPa\*s = 1 Centipoise (Cp)