

Safety Data Sheet

Material: 291461

**Hyper pure Silicon Wafers < 1 % Arsenic
(polished, epitaxial and non polished)**

Version: 1.3 (US)

Date of print: 11/18/2019

Date of last alteration: 11/16/2019

1. Product and company identification

1.1 Identification of the substance or preparation:

Commercial product name: **Hyper pure Silicon Wafers < 1 % Arsenic
(polished, epitaxial and non polished)**

Use of substance / preparation: Industrial.
Raw material for the production of silicon products

1.2 Company/undertaking identification:

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

Customer information: Siltronic Corporation
7200 N.W. Front Avenue
Portland, OR 97210-3676
USA

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

Transportation emergency: (800) 424-9300 (CHEMTREC, USA)

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

2. Hazards identification

2.1 Classification of the substance or mixture

Classification (GHS):

Not a hazardous substance or mixture.

2.2 Label elements

Labelling (GHS):

No labeling according to GHS required.

2.3 Other hazards

Under certain conditions (see sec 10), the product can split off the gases arsine and hydrogen. Arsine shows strong toxic effects by inhalation and is also classified in terms of other physical hazards, health hazards and environmental hazards. Hydrogen is classified in terms of physical hazards.

3. Composition/information on ingredients

3.1 Chemical characterization (substance)

CAS No.	Chemical characteristics
	Silicon

3.2 Information on ingredients:

Type	CAS No.	Substance	Content [wt. %]		Note
			Lower	Upper	
INHA	7440-42-8	Boron			
INHA	7723-14-0	Phosphorus (red)			
INHA	7440-36-0	Antimony			
INHA	7440-38-2	Arsenic			C1, C2, C3



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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.

A tiny amount of boron (CAS-No 7440-42-8), phosphorus (CAS-No 7723-14-0), antimony (CAS-No 7440-36-0), or arsenic (CAS-No 7440-38-2) is included as your requested resistivity.

Substances listed in the Subsections "HAPS" and "California Proposition 65 Carcinogens / Reproductive Toxins" that are not listed in this section 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. Specific chemical identities and/or exact percentage (concentration) of the composition may have been withheld as a trade secret.

This product does not contain substances of very high concern (Regulation (EC) No 1907/2006 (REACH), Article 57) in amounts above $\geq 0.1\%$.

4. First-aid measures

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.

5. Fire-fighting measures

5.1 Flammable properties:

Property:	Value:	Method:
Flash point.....	not applicable	
Boiling point / boiling range.....	2355 °C (4271 °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



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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:

Observe local/state/federal regulations.

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.

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:

Observe local/state/federal regulations. Protect against moisture.

Advice for storage of incompatible materials:

Keep away from alkalis. Avoid contact with acids.

Further information for storage:

Protect against moisture.

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.

8.2 Associate substances with specific control parameters such as limit values

Maximum airborne concentrations at the workplace:

CAS No.	Substance	Type	mg/m ³	ppm	Dust fract.
7784-42-1	Arsine	OSHA PEL	0.2	0.05	

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	Particulates not otherwise classified (insoluble or poorly soluble)	OSHA PEL	15.0		Inhalable dust/mist
	Particulates not otherwise classified (insoluble or poorly soluble)	OSHA PEL	5.0		Respirable dust/mist
7784-42-1	Arsine	ACGIH TWA		0.05	
	Particulates not otherwise classified (insoluble or poorly soluble)	ACGIH TWA	10.0		Inhalable dust/mist
	Particulates not otherwise classified (insoluble or poorly soluble)	ACGIH TWA	3.0		Respirable dust/mist
7440-38-2	Arsenic	ACGIH TWA	0.01		

Re Particulates not otherwise classified: The value is for particulate matter containing no asbestos and < 1 % crystalline silica (ACGIH).

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.

9. Physical and chemical properties

9.1 Appearance

Physical state: solid
 Form: compact
 Colour: silver
 Odour: odourless

9.2 Safety parameters

Property:	Value:	Method:
Melting point / melting range.....:	1410 °C (2570 °F)	
Boiling point / boiling range.....:	2355 °C (4271 °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.....:	ca. 2.32 g/cm ³	
Water solubility / miscibility.....:	virtually insoluble	
pH-Value.....:	not applicable	
Viscosity (dynamic).....:	not applicable	
Viscosity (kinematic).....:	not applicable	

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10. Stability and reactivity

10.1 General information:

If stored and handled in accordance with standard industrial practices no hazardous reactions are known.

10.2 Conditions to avoid

moisture

10.3 Materials to avoid

water , lyes , acids . Reaction causes the formation of: Arsine , hydrogen .

10.4 Hazardous decomposition products

If stored and handled properly: none known . Upon contact with the substances mentioned in 10. Arsine , hydrogen .

10.5 Further information:

Hazardous polymerization cannot occur.

11. Toxicological information

11.1 Information on toxicological effects

11.1.1 General information

Data derived for the product as a whole are of higher priority than data for single ingredients.

11.1.2 Acute toxicity

Assessment:

For this endpoint no toxicological test data is available for the whole product.

Data on substances:

Silicon:

Route of exposure	Result/Effect	Species/Test system	Source
Oral	LD50: > 5000 mg/kg	Rat	literature (read-across substance)
dermal	LD50: > 5000 mg/kg	Rabbit	literature (read-across substance)

11.1.3 Skin corrosion/irritation

Assessment:

For this endpoint no toxicological test data is available for the whole product.

Data on substances:

Silicon:

Result/Effect	Species/Test system	Source
not irritating	Rabbit	literature (read-across substance)

11.1.4 Serious eye damage / eye irritation

Assessment:

For this endpoint no toxicological test data is available for the whole product.

Data on substances:

Silicon:

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Result/Effect	Species/Test system	Source
not irritating	Rabbit	literature (read-across substance)

11.1.5 Respiratory or skin sensitization

Assessment:

For this endpoint no toxicological test data is available for the whole product.

Data on substances:

Silicon:

During several years of handling this material, there were no indications of a skin-sensitizing potential.

11.1.6 Germ cell mutagenicity

Assessment:

For this endpoint no toxicological test data is available for the whole product.

Data on substances:

Silicon:

Based on known data a significant mutagenic potential may be excluded.

11.1.7 Carcinogenicity

Assessment:

For this endpoint no toxicological test data is available for the whole product.

Data on substances:

Silicon:

No data known.

11.1.8 Reproductive toxicity

Assessment:

For this endpoint no toxicological test data is available for the whole product.

Data on substances

Silicon:

On the basis of the available data no reproductive hazards are expected. The evaluation is in analogy to a tested product.

11.1.9 Specific target organ toxicity (single exposure)

Assessment:

For this endpoint no toxicological test data is available for the whole product.

11.1.10 Specific target organ toxicity (repeated exposure)

Assessment:

For this endpoint no toxicological test data is available for the whole product.

Data on substances:

Silicon:

No systemic toxicity.

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Result/Effect	Species/Test system	Source
NOAEL: 4000 - 5000 mg/kg	Subchronic study rat oral	literature (read-across substance)

11.1.11 Aspiration hazard

Assessment:

Based on the physical-chemical properties of the product no aspiration hazard must be expected.

11.1.12 Further toxicological information

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

12. Ecological information

12.1 Toxicity

Assessment:

For the product as a whole, no test data is available. Evaluation on basis of physical-chemical properties: No expected damaging effects to aquatic organisms.

Data on substances:

Data derived for the product as a whole are of higher priority than data for single ingredients.

Silicon:

No expected damaging effects to aquatic organisms.

12.2 Persistence and degradability

Assessment:

For the product as a whole, no test data is available.

Data on substances:

Silicon:

Separation by sedimentation.

12.3 Bioaccumulative potential

Assessment:

No data known.

12.4 Mobility in soil

Assessment:

For the product as a whole, no test data is available.

12.5 Results of PBT and vPvB assessment

No data available.

12.6 Other adverse effects

none known

13. Disposal considerations



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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). Empty containers should be sent to an approved recycling facility.

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

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 reportable amounts of any TSCA 12(b) listed 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):

CAS No.	Chemical	Upper limit wt. %
7440-38-2	Arsenic	<=0.9999

15.2 U.S. State regulations

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986):

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

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



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Pennsylvania Right-to-Know Hazardous Substance List:

7440-21-3 Silicon

15.3 Details of international registration status

Relevant information about individual substance inventories, where available, is given below.

Japan.....	ENCS (Handbook of Existing and New Chemical Substances): This product is listed in, or complies with, the substance inventory.
Australia	AICS (Australian Inventory of Chemical Substances): This product is listed in, or complies with, the substance inventory.
China	IECSC (Inventory of Existing Chemical Substances in China): This product is listed in, or complies with, the substance inventory.
Canada.....	DSL (Domestic Substance List): This product is listed in, or complies with, the substance inventory.
Philippines.....	PICCS (Philippine Inventory of Chemicals and Chemical Substances): This product is listed in, or complies with, the substance inventory.
United States of America (USA).....	TSCA (Toxic Substance Control Act Chemical Substance Inventory): All components of this product are listed as active or are in compliance with the substance inventory.
European Economic Area (EEA).....	REACH (Regulation (EC) No 1907/2006): REACH registration number: 01-2119480401-47-0220 General note: the registration obligations for substances imported into the EEA or manufactured within the EEA by the supplier mentioned in section 1 are fulfilled by the said supplier. The registration obligations for substances imported into the EEA by customers or other downstream users must be fulfilled by the latter.
South Korea (Republic of Korea).....	AREC (Act on Registration and Evaluation of Chemicals; "K-REACH"): General note: in case of registration obligations for substances or polymers imported into Korea or manufactured within Korea these are fulfilled by the supplier mentioned in section 1. The registration obligations for substances or polymers imported into Korea by customers or other downstream users must be fulfilled by the latter.

16. Other information

16.1 Additional information:

This Safety Data Sheet (SDS) meets the requirements of the Federal OSHA Hazard Communication Standard (29 CFR 1910.1200). 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 SDS 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.

Vertical lines in the left-hand margin indicate changes compared with the previous version.

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



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Flash point determination methods	Common name
ASTM D56.....	Tagliabue (Tag) closed cup
ASTM D92, DIN 51376, ISO 2592.....	Cleveland open cup
ASTM D93, DIN 51758, ISO 2719.....	Pensky-Martens closed cup
ASTM D3278, DIN 55680, ISO 3679.....	Setaflash or Rapid closed cup
DIN 51755	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)