

SPI Supplies Division

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Manufacturer's CAGE: 1P573



Material Safety Data Sheet

[SPI # 4078SN-BA, 4079SN-BA, 4080SN-BA, 4081SN-BA, 4082SN-BA, 4083SN-BA, 4084SN-BA, 4085SN-BA Silicon Nitride Membrane Window Slot Grids for TEM](#)

[SPI #4109SN-BA, 4120SN-BA, 4121SN-BA, 4122SN-BA, 4123SN-BA, 4124SN-BA, 4125SN-BA, 4159SN-BA, 4112SN-BA, 4131SN-BA, 4132SN-BA, 4192SN-BA, 4160SN-MB, 4098SN-BA, 4099SN-BA, 4100SN-BA, 4101SN-BA, 4102SN-BA, 4103SN-BA, 4104SN-BA, 4105SN-BA, 4091SN-BA, 4092SN-BA, 4093SN-BA, 4094SN-BA, 4095SN-BA, 4096SN-BA, 4097SN-BA, 4090SN-BA Silicon Nitride Membrane Window Grids](#)

[SPI #4134SN-BA, 4138SN-BA, 4139SN-BA, 4141SN-BA, 4142SN-BA, 4151SN-BA SPI Silicon Nitride Membrane Window™ Arrays](#)

[SPI #4126SN-BA, 4126SN-FA, 4126SN-MB, 4144SN-BA, 4144SN-FA, 4144SN-MB, 4128SN-BA, 4128SN-FA, 4128SN-MB, 4145SN-BA, 4145SN-FA, 4145SN-MB, 4129SN-BA, 4129SN-FA, 4129SN-MB, 4146SN-BA, 4146SN-FA, 4146SN-MB, 4107SN-CF, 4130SN-BA, 4133SN-BA Silicon Nitride Membrane Windows™ for X-ray Microscopy](#)

[SPI # 4087SN-AF, 4087SN-BA, 4087SN-CF Silicon Nitride Coated Wafers](#)

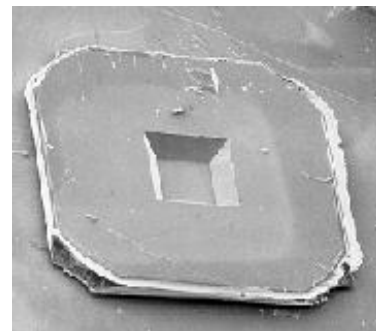
[SPI # 4086SN-AF, 4086SN-BA, 4086SN-CF Silicon Wafers, Silicon Nitride \(Si₃N₄\)](#)

Section 01: Identification

Date Effective... January 8, 2009
(most recent revision)

Chemical Name/Synonyms... Silicon chips with membrane

Chemical Family..... Metal



Emergencies

Use Only #'s:

Contacting CHEMTREC 24 Hour Emergency
 Worldwide phone : 1-(703)-527-3887
 Worldwide FAX : 1-(703)-741-6090
 Toll-free phone : 1-(800)-424-9300 USA only

Product or Trade Name.... SPI Supplies® Brand Silicon Nitride Membrane
 Windows on Silicon Frames

CAS #..... 7440-21-3 9 (for silicon)

Chemical Formula..... Si

NFPA (National Fire Protection Association)
 Rating (Scale 0-4): Not applicable

Section 02: Composition information on Ingredients

Component	CAS #	EINECS #	Appr %
Silicon	7440-21-3	231-130-8	< 99.9%
Silicon nitride	12033-89-5		> 0.1%

Section 03: Hazards Identification

Emergency Overview:

In the as-received form, virtually nothing is present in the form of dust since it is manufactured under clean room conditions. However, if this material is ground down into a dust, then the dust can be irritating. However in the normal use of this product, it is not anticipated that one would be doing any mechanical processing.

Physical state: Silver-gray "wafer" color

Potential health effects (overview):

Eyes:

May cause eye irritation but one is not normally bringing this material in this form in contact with the eye.

Skin:

May cause skin irritation but one is not normally bringing this material in this form in contact with skin.

Ingestion:

Very unlikely that these materials could ever be swallowed. However, we do not know what effects it could have on either the digestive track or other

parts of the digestive system. The sharp corners on the materials could cause internal bleeding.

Inhalation:

If the material is heated, any vapors coming from it should not be inhaled. We don't know what would be the composition of such vapors. If the material is heated within an electron microscope for *in situ* experiments, then any vapors generated would be pumped out by the vacuum system and ultimately exhausted to the environment.

Chronic:

Not known

Section 04: First Aid Measures

Over view:

It is highly unlikely that one could expose themselves to this material in a way that would ever require first aid, assuming the product was used as intended.

First Aid for Eyes:

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

First Aid for Skin:

Flush skin with soapy water for at least 15 minutes. Remove contaminated clothing including shoes. Get medical attention if irritation develops. Be sure to wash clothing before use.

First Aid for Inhalation:

Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

Section 05: Fire Fighting Measures

General Information:

As in any fire, wear a self-contained breathing apparatus, MSHA/NIOSH (approved or equivalent), and full protective gear. Dusts at sufficient concentrations can form explosive mixtures with air. Dousing metallic fires with water may generate hydrogen gas, an extremely dangerous explosion hazard. The small nature of these materials is such that any fire should be treated for the surrounding contents, not the silicon membrane window grids.

Section 06: Accidental Release Measures

Overview:

Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Situation not applicable.

Section 07: Handling and Storage

Handling: Handle with high precision [tweezers and not with the fingers](#).

Storage: If TEM grids, store in a [Twist-A-Grid™ or Slide-A-Grid™ grid storage box](#). Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture.

Section 08: Exposure Controls and Personal Protection

Engineering Controls:

None required if products is being used as intended.

Personal Protective Equipment:

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in **29 CFR 1910.133** or European Standard EN166. This is recommended for any laboratory procedure and eye protection is more needed to protect against dangers from using the sharp precision tweezers than the silicon membrane products themselves.

Skin: Not necessary to protect skin when handling these materials with tweezers.

Clothing: Not necessary when working with these membrane window grids.

Respirators: A NIOSH/MSHA approved air purifying dust or mist respirator or European Standard EN 149.

Section 09: Physical and Chemical Properties

Physical State:	Solid
Appearance:	Silver-gray
Odor:	None

pH:	Not applicable.
Vapor Pressure:	Nil
Vapor Density:	Not applicable
Evaporation Rate:	Does not evaporate at room temperature
Viscosity:	Not applicable
Boiling Point:	2355°C
Freezing/Melting Point:	1410°C
Autoignition Temperature:	Not applicable.
Flash Point:	Not applicable.
Explosion Limits, lower:	Not available.
Explosion Limits, upper:	Not available.
Decomposition Temperature:	Not available.
Solubility:	Insoluble in water.
Specific Gravity/Density:	Not available.
Molecular Formula:	Si
Molecular Weight:	28.0856

Section 10 Stability and Reactivity

Chemical Stability:

Stable under normal temperatures and pressures.

Conditions to Avoid:

Incompatible materials, dust generation, moisture, excess heat (without proper protection as *in situ* experiments in a TEM).

Incompatibilities with Other Materials:

Moisture, strong oxidizing agents.

Hazardous Decomposition Products:

Irritating and toxic fumes and gases, oxides of silicon.

Hazardous Polymerization:

Has not been reported.

Section 11: Toxicological Information

RTECS#: VW0400000
CAS#: 7440-21-3

LD₅₀/LC₅₀:

CAS# 7440-21-3:

Draize test, rabbit, eye: 3 mg Mild; Oral, rat: LD₅₀ = 3160 mg/kg.

Carcinogenicity:

IARC: Group 3 carcinogen (**listed as undefined**).

Epidemiology:

IARC has concluded there is inadequate evidence to describe amorphous silica as carcinogenic in animals or in humans. Crystalline silica has been designated as a probable human carcinogen. However these materials are made of silicon and under normal use, would not be exposed to conditions where the silicon would be converted to silica of any form.

Teratogenicity:

No information available.

Reproductive Effects:

No information available.

Neurotoxicity:

No information available.

Mutagenicity:

No information available.

Other Studies:

No information available.

Section 12: Ecological Information

Environmental: When used as intended, its disposal would be determined by what samples were being analyzed and the MSDS for those other materials should guide the disposal procedures. If the materials are used strictly as x-ray windows with contact with other materials, they can be disposed of as an inert material. No adverse environmental effects are foreseen.

Mobility: Non-volatile/Insoluble in water.

Degradability: Not biodegradeable

Section 13: Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations

Section 14: Transport Information

DOT Shipping Name: Not regulated
DOT Hazard Class: None
Product RQ: None
Technical Shipping Name: Metal alloy
UN or NA number: None

Section 15: Regulatory Information

United States of America:

TSCA

CAS# 7440-21-3 is listed on the TSCA inventory.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

Individual states of the USA:

Silicon can be found on the following state right to know lists: California, (listed as "no name"), New Jersey, Florida, (listed as "no name"), Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level:

None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: Not available.

Risk Phrases:

Safety Phrases: WGK (Water Danger/Protection)

CAS# 7440-21-3: No information available.

United Kingdom Occupational Exposure Limits

CAS# 7440-21-3: OES-United Kingdom, TWA total inhalable dust:

10mg/m³ TWA; respirable dust: 4 mg/m³ TWA

Canada

CAS# 7440-21-3 is listed on Canada's DSL List.

CAS# 7440-21-3 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits in Other Countries

CAS# 7440-21-3:

OEL-AUSTRALIA:TWA 10 mg/m³

OEL-BELGIUM:TWA 10 mg/m³

OEL-DENMARK:TWA 10 mg/m³

OEL-FRANCE:TWA 10 mg/m³

OEL-THE NETHERLANDS:TWA 10 mg/m³

OEL-SWITZERLAND:TWA 4 mg/m³

OEL-UNITED KINGDOM:TWA 10 mg/m³ (total dust) JAN9

OEL-UNITED KINGDOM:TWA 5 mg/m³ (resp. dust)

OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV

OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16: Additional Information

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