



Applied Physics, Inc.

400 N County Road 2E
Monte Vista, CO 81144 USA

Nano Particle Technology

Cel 1-720-635-3931
Email Sales@AppliedPhysicsUSA.com
Web www.AppliedPhysicsUSA.com

Material Data Safety Sheet, MSDS, SiO2 Nanoparticles

Section 1: Company Identification

Supplier: Applied Physics, Inc., 400 N County Road 2E, Monte Vista, CO 81144 USA
Part Name: Silicon Dioxide Nanoparticles
Part#: SS/005/ Powder, bulk, 1 lb and above
Part#: SiO2 10% Powder in 15ml distilled water solution

Section 2: Composition/ Information on Ingredients

1 Silicon dioxide (SiO2)

Section 3: Hazards Identification

Low hazard for usual industrial or commercial handling.

Hazard Ratings:

These ratings reference the ANSI/NFPA 704 Standard.

Additional information can be found by consulting in the NFPA published ratings lists (List 325 and List 49).

If no data is listed the information is not available.

Health	Flammability	Reactivity
1	0	0



Section 4: First Aid Measures

Contact medical personnel.

Flush eyes with flowing water for at least 15 minutes.

If swallowed, give 8 oz. of water or milk to drink. Never give anything by mouth to an unconscious person.

Remove contaminated clothing.

Separate eyelids with finger tips.

Wash skin with deluge of water for at least 15 minutes.

Section 5: Fire Fighting Measures

Flash point, deg F.: not combustible Method: nap

UEL: no data LEL: no data Auto-Ignition temperature, deg. F.: no data

Flammability Classification: no data Flame Propagation Rate: no data

Hazardous Combustion Products: no data

Section 6: Accidental Release Measures

Any information listed below is to be considered in addition to internal guidelines for isolation of spill, containment of spill, removal of ignition sources from immediate area, and collection for disposal of spill by trained, properly protected clean up personnel.

Contain spilled liquids.

No special measures are indicated.

Section 7: Handling and Storage

Handling: For safe handling: Keep container tightly sealed and store in cool, dry area in closed containers. Ensure good ventilation is present.

Product is not flammable.

Storage: No special requirements to be met by storerooms and receptacles. Do not store with acids. Store away from halogens. Store away from oxidizing agents. Further information about storage conditions Protect from humidity and water. Keep container tightly sealed. Store in cool, dry conditions in well sealed containers.

Section 8: Exposure Controls and Personal Protection

Additional information about design of technical systems: Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Silica, crystalline-quartz, mg/m3

ACGIH TLV	0.1 (respirable particulate)
Belgium TWA	0.1
Denmark TWA	0.1

Section 8 Continued: Components with limit values that require monitoring at the workplace:

Finland TWA	0.2
Germany TWA	0.15 (respirable fraction of the aerosol)
Ireland TWA	0.4 (respirable)
Netherlands TWA	0.075 (respirable)
Russia TWA	14
Sweden TWA	0.1
Switzerland TWA	0.15
United Kingdom TWA	0.3 (respirable)
USA PEL	30%SiO2+2 (total dust)
	10%SiO2+2 (respirable dust)



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Silica, crystalline-tridymite and cristobalite, mg/m3	
ACGIH TLV	0.05 (respirable particulate)
Belgium TWA	0.05
Denmark TWA	0.05
Finland TWA	0.1
France TWA	10
Germany TWA 0.	15 (respirable fraction of the aerosol)
Ireland TWA	0.4 (respirable)
Netherlands TWA	0.075 (respirable)
Sweden TWA	0.05
Switzerland TWA	0.15
USA PEL	0.5 (value calculated for quartz-respirable dust)

Silica, crystalline-tripoli, mg/m3	
ACGIH TLV	0.1 (of contained respirable quartz)
Belgium TWA	0.1
Germany TWA	0.15 (respirable fraction of the aerosol)
Ireland TWA	0.4 (respirable)
USA PEL	See quartz

Silica, amorphous-diatomaceous earth, mg/m3	
ACGIH TLV	10 (inhalable particulate) 3 (respirable particulate)
Germany TWA	4 (inhalable fraction of the aerosol)
Ireland TWA	1.5
United Kingdom TWA	1.2 (respirable dust) USA PEL 20 mppcf

Silica, amorphous, mg/m3	
Ireland TWA	3 (respirable); 6 (total inhalable)
United Kingdom TWA	2.4 (respirable); 6 (total inhalable)

Silica, amorphous-fused, mg/m3	
ACGIH TLV	0.1 (respirable particulate)
Finland TWA	5
Germany TWA	0.3 (respirable fraction of the aerosol)
Ireland TWA	0.1 (respirable)
United Kingdom TWA	0.3 (respirable dust)

Silica, amorphous-fume mg/m3	
ACGIH TLV	2 (respirable particulate)
Germany TWA	0.3 (respirable fraction of the aerosol)

Silica, amorphous-precipitated and gel, mg/m3	
ACGIH TLV	10 (inhalable particulate)
Germany TWA	4 (inhalable fraction of the aerosol)
USA PEL	20 mppcf

Additional information: No data

Personal protective equipment General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed. Keep away from foodstuffs, beverages and feed. Remove all soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work. Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands: Impervious gloves

Eye protection: Safety glasses

Body protection: Protective work clothing.

Section 9: Physical and chemical properties

Form: Powder, bulk, Powder in 15ml distilled water solution

Color: White

Odor: Odorless

Value/Range	Unit	Method
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Change in condition

Melting point/Melting range: 1610-1728 degrees C

Boiling point/Boiling range: 2230 degrees C

Sublimation temperature / start: Not determined

Flash point: Not applicable

Ignition temperature: Not determined

Decomposition temperature: Not determined

Danger of explosion: Product does not present an explosion hazard.

Explosion limits:

Lower: Not determined





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Upper: Not determined
Vapor pressure: Not determined
Density: at 20 degrees C 1.973 g/cm³
Solubility in / Miscibility w/ Water: Insoluble

Section 10: Stability and Reactivity

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Materials to be avoided: Hydrogen fluoride (HF) Interhalogens Halogens Oxidizing agents
Dangerous reactions: Reacts violently with interhalogens.
Dangerous products of decomposition: No dangerous decomposition products known

Section 11: Toxicological Information

Acute toxicity: Primary irritant effect on the skin: Irritant to skin, mucous membranes, on the eye.
Sensitization: No sensitizing effects known.
Other information (about experimental toxicology): Tumorigenic effects have been observed on tests with laboratory animals. Reproductive effects have been observed on tests with laboratory animals. Carcinogenic effects have been observed on tests with laboratory animals.
Subacute to chronic toxicity: Prolonged inhalation of silica may cause silicosis, the formation of adhesions in the lungs progressing to the formation of a continuous mass of fibrous tissue. If the disease continues, death may occur. Tuberculosis is often found in people with silicosis. Some forms of silica are more fibrogenic than others. Some forms of crystalline silica have shown carcinogenic, tumorigenic and neoplastic effects in laboratory animals. Amorphous silica is less harmful by inhalation than crystalline forms. Amorphous silica may, however, contain small amounts of crystalline silica.
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known. The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product. IARC-1: Carcinogenic to humans: sufficient evidence of carcinogenicity. NTP-2: Reasonably anticipated to be a carcinogen: limited evidence from studies in humans or sufficient evidence from studies in experimental animals.

Section 12: Ecological Information

General notes: Do not allow material to be released to the environment without proper governmental permits.

Section 13: Disposal considerations

Product:
Recommendation Consult state, local or national regulations for proper disposal.
Unclean packages:
Recommendation: Disposal must be made according to official regulations.

Section 14: Transport Information

Not a hazardous material for transportation.
DOT regulations:
Hazard class: None
Land transport ADR/RID (cross-border)
ADR/RID class: None
Maritime transport IMDG:
IMDG Class: None
Air transport ICAO-TI and IATA-DGR:
ICAO/IATA Class: None
Transport/Additional information: Not dangerous according to the above specifications.

Section 15: Regulations

Product related hazard information:
Hazard symbols: Xn Harmful
Risk phrases:
20 Harmful by inhalation.
37 Irritating to respiratory system.
Safety phrases:
9 Keep container in a well-ventilated place.
36 Wear suitable protective clothing.
National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory. This product contains a chemical known to the state of California to cause cancer or reproductive toxicity.
Information about limitation of use:
For use only by technically qualified individuals.

Section 16: Other Information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgment of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.





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2.0 µm SiO2 Sample Particle Size Response

Brookhaven Instruments Corp.
90Plus Particle Sizing Software, Version 5.23
Sample ID 111121XA1A2A3A4B5B6B7 (Combined)
Operator ID LS

Date: Feb 26, 2016
Time: 11:24:17
Batch 0

Notes:

2.0 µm Nominal Sample

Measurement Parameters:

Temperature	= 25.0 deg. C	Runs Completed	= 3
Liquid	= Water	Run Duration	= 00:00:30
Viscosity	= 0.890 cP	Total Elapsed Time	= 00:01:30
Ref. Index Fluid	= 1.330	Average Count Rate	= 474.4 kcps
Angle	= 90.00	Ref. Index Real	= 1.430
Wavelength	= 657.0 nm	Ref. Index Imag	= 0.000
Baseline	= Auto (Slope Analysis)	Dust Filter	= Off

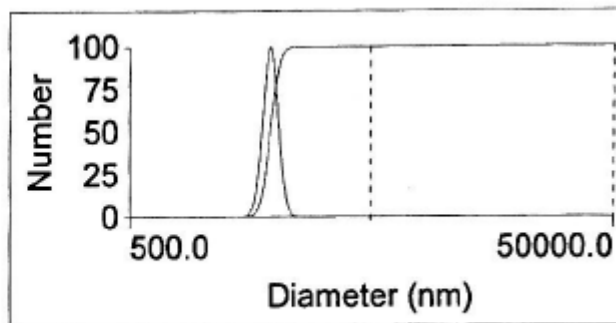
111121XA1A2A3A4B5B6B7 (Combined)

Effective Diameter: 1988.1 nm

Polydispersity: 0.005

Baseline Index: 8.7

Elapsed Time: 00:01:30



Lognormal Distribution

Run	Eff. Diam. (nm)	Half Width (nm)	Polydispersity	Baseline Index
1	2011.5	142.2	0.005	9.7
2	1956.6	138.3	0.005	2.2
3	1978.9	566.8	0.082	7.0
Mean	1982.3	282.4	0.031	6.3
Std. Error	15.9	142.2	0.026	2.2
Combined	1988.1	140.6	0.005	8.7