

## SAFETY DATA SHEET

### 1. SUBSTANCE AND SOURCE IDENTIFICATION

**Product Identifier**

**SRM Number:** 656  
**SRM Name:** Silicon Nitride Powders (Quantitative Analysis by Powder Diffraction Standard)  
**Other Means of Identification:** Not applicable.

**Recommended Use of This Material and Restrictions of Use**

This Standard Reference Material (SRM) consists of two powders intended for quantitative analysis of the  $\alpha$  and  $\beta$  polymorphs of silicon nitride via powder diffraction methods. A unit of SRM 656 consists of two bottles containing approximately 10 g of each powder.

**Company Information**

National Institute of Standards and Technology  
 Standard Reference Materials Program  
 100 Bureau Drive, Stop 2300  
 Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200  
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 1-800-424-9300 (North America)  
 +1-703-527-3887 (International)

### 2. HAZARDS IDENTIFICATION

**Classification**

**Physical Hazard:** Not classified.  
**Health Hazard:** Not classified.

**Label Elements**

**Symbol:** No Symbol

**Signal Word:** No Signal Word

**Hazard Statement(s):** Not applicable.

**Precautionary Statement(s):** Not applicable.

**Hazards Not Otherwise Classified:** Not applicable.

**Ingredients(s) with Unknown Acute Toxicity:** Not applicable.

### 3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

**Substance:** Silicon nitride

**Other Designations:** Trisilicon tetranitride; silicon nitride;  $\text{Si}_3\text{N}_4$

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Silicon nitride	12033-89-5	234-796-8	100

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## 4. FIRST AID MEASURES

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### Description of First Aid Measures:

**Inhalation:** If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

**Skin Contact:** Wash skin with soap and water for at least 15 minutes. If necessary, seek medical attention.

**Eye Contact:** Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

**Ingestion:** If a large amount is swallowed, get medical attention.

**Most Important Symptoms/Effects, Acute and Delayed:** No data available; generated dust may result in irritation.

**Indication of any immediate medical attention and special treatment needed, if necessary:** If any of the above symptoms are present, seek medical attention if needed.

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## 5. FIRE FIGHTING MEASURES

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**Fire and Explosion Hazards:** Negligible fire hazard. Dust/air mixtures may ignite or explode. See Section 9, "Physical and Chemical Properties" for flammability properties.

### Extinguishing Media:

Suitable: Use extinguishing agents appropriate for surrounding fire.

Unsuitable: None listed.

**Specific Hazards Arising from the Chemical:** None listed.

**Special Protective Equipment and Precautions for Fire-Fighters:** Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA). Move container from fire area if it can be done without risk. Stay upwind and keep out of low areas.

**NFPA Ratings** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1

Fire = 0

Reactivity = 0

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## 6. ACCIDENTAL RELEASE MEASURES

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**Personal Precautions, Protective Equipment and Emergency Procedures:** Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

**Methods and Materials for Containment and Clean up:** Notify safety personnel of spills. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

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## 7. HANDLING AND STORAGE

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**Safe Handling Precautions:** Avoid generating dust. See Section 8, "Exposure Controls and Personal Protection".

**Storage:** Store and handle in accordance with all current regulations and standards.

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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**Exposure Limits:** No occupational exposure limits have been established for this material. The exposure limits for Particulates Not Otherwise Regulated are applicable.

OSHA (PEL): 15 mg/m<sup>3</sup> (TWA, total particulates)  
5 mg/m<sup>3</sup> (TWA, respirable particulates)

NIOSH (REL): 10 mg/m<sup>3</sup> (TWA, total particulates)  
5 mg/m<sup>3</sup> (TWA, respirable particulates)

**Engineering Controls:** Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

**Personal Protection:** In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

**Respiratory Protection:** If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

**Eye/Face Protection:** Wear splash resistant safety goggles with a face shield. An eyewash station should be readily available near areas of use.

**Skin and Body Protection:** Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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### Descriptive Properties

<b>Appearance (physical state, color, etc.)</b>	white to gray amorphous powder
<b>Molecular Formula</b>	N <sub>4</sub> Si <sub>3</sub>
<b>Molar Mass (g/mol)</b>	140.28
<b>Odor</b>	not available
<b>Odor threshold</b>	not available
<b>pH</b>	not available
<b>Evaporation rate</b>	not available
<b>Melting point/freezing point (°C)</b>	not available
<b>Specific Gravity (water = 1)</b>	3.44
<b>Density (g/L)</b>	not available
<b>Vapor Pressure (mmHg)</b>	not available
<b>Vapor Density (air = 1)</b>	not available
<b>Viscosity (cP)</b>	not available
<b>Solubility(ies)</b>	insoluble in water; soluble in hydrofluoric acid
<b>Partition coefficient (n-octanol/water)</b>	not available
<b>Particle Size</b>	not available

### Thermal Stability Properties

<b>Autoignition Temperature (°C)</b>	not available
<b>Thermal Decomposition (°C)</b>	not available
<b>Initial boiling point and boiling range (°C)</b>	not available
<b>Explosive Limits, LEL (Volume %)</b>	not available
<b>Explosive Limits, UEL (Volume %)</b>	not available
<b>Flash Point (°C)</b>	not available
<b>Flammability (solid, gas)</b>	not available

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## 10. STABILITY AND REACTIVITY

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**Reactivity:** Stable at normal temperatures and pressure.

**Stability:**  X  Stable   Unstable

**Possible Hazardous Reactions:** No data available.

**Conditions to Avoid:** Generating dust, heat, flames, sparks and other sources of ignition.

**Incompatible Materials:** none listed.

**Fire/Explosion Information:** See Section 5, "Fire Fighting Measures".

**Hazardous Decomposition:** Oxides of nitrogen.

**Hazardous Polymerization:**   Will Occur  X  Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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Route of Exposure:  Inhalation  Skin  Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Exposure may result in irritation.

### Potential Health Effects (Acute, Chronic and Delayed):

**Inhalation:** No data available; exposure may result in respiratory tract irritation.

**Skin Contact:** Skin exposure may result in mechanical irritation. Repeated or prolonged contact may cause dermatitis.

**Eye Contact:** Direct contact may cause irritation, redness and pain. Chronic exposure may cause conjunctivitis.

**Ingestion:** May cause nausea, vomiting and diarrhea.

### Numerical Measures of Toxicity:

**Acute Toxicity:** Not classified.

**Skin Corrosion/Irritation:** Not classified; no data available.

**Serious Eye Damage/Irritation:** Not classified; no data available.

**Respiratory Sensitization:** Not classified; no data available.

**Skin Sensitization:** Not classified; no data available.

**Germ Cell Mutagenicity:** Not classified; no data available.

**Carcinogenicity:** Not classified.

**Listed as a Carcinogen/Potential Carcinogen**  Yes  No  
Silicon nitride is not listed by NTP, IARC or OSHA as a carcinogen/potential carcinogen.

**Reproductive Toxicity:** Not classified; no data available.

**Specific Target Organ Toxicity, Single Exposure:** Not classified; no data available.

**Specific Target Organ Toxicity, Repeated Exposure:** Not classified; no data available.

**Aspiration Hazard:** Not classified; no data available.

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## 12. ECOLOGICAL INFORMATION

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**Ecotoxicity Data:** No data available.

**Persistence and Degradability:** No data available.

**Bioaccumulative Potential:** No data available.

**Mobility in Soil:** No data available.

**Other Adverse effects:** No data available.

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal:** Dispose of waste in accordance with all applicable federal, state, and local regulations.

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## 14. TRANSPORTATION INFORMATION

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**U.S. DOT and IATA:** Not regulated by DOT or IATA.

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## 15. REGULATORY INFORMATION

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### U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH: No.  
CHRONIC HEALTH: No.  
FIRE: No.  
REACTIVE: No.  
PRESSURE: No.

**State Regulations:**

California Proposition 65: Not listed.

**U.S. TSCA Inventory:** Listed.

**TSCA 12(b), Export Notification:** Not listed.

**Canadian Regulations:**

WHMIS Information is not provided for this material.

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## 16. OTHER INFORMATION

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**Issue Date:** 11 April 2016

**Sources:** ChemAdvisor, Inc., SDS, *Silicon Nitride*, 09 December 2015.

CDC; NIOSH; *NIOSH Pocket Guide to Chemical Hazards*; Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), National Institute for Safety and Health; *Particulates not otherwise regulated*, 13 February 2015; available at <http://www.cdc.gov/niosh/npg/npgd0480.html> (accessed Apr 2015).

**Key of Acronyms:**

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transport Association	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

**Disclaimer:** Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail [srmmsds@nist.gov](mailto:srmmsds@nist.gov); or via the Internet at <http://www.nist.gov/srm>.