

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 2960
SRM Name: Respirable Cristobalite on Filter Media
 (Nominal Mass of Cristobalite, 5 µg – 250 µg)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended primarily for the calibration of X-ray diffraction (XRD) spectrometers for the determination of respirable cristobalite using National Institute for Occupational Safety and Health (NIOSH) Method 7500, or equivalent method. The SRM was produced by depositing a known amount of SRM 1879a *Respirable Cristobalite* as a slurry on a 25 mm diameter polyvinyl chloride (PVC) filter. A unit of SRM 2960 consists of 30 blank PVC filters containing no cristobalite and 5 loaded PVC filters at each of the following nominal levels: 5 µg, 10 µg, 20 µg, 50 µg, 100 µg, and 250 µg. The blank filters and the loaded filters are stored in two clear plastic petri dishes, respectively, with blue spacer sheets separating the filters.

Company Information

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 Standard Reference Materials Program
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2. HAZARDS IDENTIFICATION

Note: The particulate material on the filter is respirable cristobalite. The health and physical hazard information provided in this SDS contains the effects associated with the inhalation of cristobalite particulates.

Classification

Physical Hazard: Not classified.
Health Hazard: Carcinogen Category 1
 STOT, Repeated Exposure Category 1

Label Elements

Symbol



Signal Word

DANGER

Hazard Statement(s):

H350 May cause lung cancer.
 H372 Causes damage to lungs through prolonged or repeated inhalation.

Precautionary Statement(s):

P201 Obtain special instructions before use.
 P202 Do not handle until all safety precautions have been read and understood.
 P260 Do not breathe dust.
 P264 Wash hands thoroughly after handling.
 P270 Do not eat, drink or smoke when using this product.

- P280 Wear protective gloves, protective clothing, and eye protection.
- P308 + P313 If exposed or concerned: Get medical attention.
- P405 Store locked up.
- P501 Dispose of contents and container in accordance with local regulations.

Hazards Not Otherwise Classified: Not applicable.

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

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: α -Cristobalite

Other Designations: Silica; silicon dioxide; crystalline silica; white silica sand; silicic anhydride; SiO₂

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

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Cristobalite	14464-46-1	238-455-4	100

4. FIRST AID MEASURES

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. Thoroughly clean and dry contaminated clothing before reuse.

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

Ingestion: If adverse effects occur after ingestion, seek medical treatment.

Most Important Symptoms/Effects, Acute and Delayed: May cause irritation, lung damage, silicosis, and cancer.

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.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire hazard. Avoid generating dust. 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).

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

Health = 1 Fire = 0 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Any accumulated material on surfaces should be removed and properly disposed of. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

Safe Handling Precautions: Minimize dust generation. See Section 8, “Exposure Controls and Personal Protection”.

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances (See Section 10, “Stability and Reactivity”).

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

ACGIH (TWA): 0.025 mg/m³ (respirable fraction)

NIOSH (TWA): 0.05 mg/m³ (respirable dust)

(IDLH): 25 mg/m³ (respirable dust)

OSHA (TWA): (1/2)[30/(% SiO₂ + 2)] mg/m³ (total dust)

(1/2)[250/(% SiO₂ + 5)] mppcf (respirable fraction)

(1/2)[10/(% SiO₂ + 2)] mg/m³ (respirable fraction)

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties:

Appearance (physical state, color, etc.):

Molecular Formula:

Molar Mass (g/mol):

Odor:

Odor threshold:

pH:

Evaporation rate:

Melting point/freezing point (°C):

Density (g/mL):

Vapor Pressure (mmHg):

Vapor Density (air = 1):

Viscosity (cP):

Solubility(ies):

Partition coefficient (n-octanol/water):

Particle Size:

Cristobalite

colorless to white, amorphous powder

SiO₂

60.09

odorless

not available

not applicable

not applicable

1710 (3110 °F)

2.32 as Specific gravity

0 at 20 °C

not applicable

not applicable

insoluble in water;
soluble in hydrofluoric acid
and molten alkali

not available

respirable

Thermal Stability Properties:

Autoignition Temperature (°C):	not applicable
Thermal Decomposition (°C):	not available
Initial boiling point and boiling range (°C):	2230 (4046 °F)
Explosive Limits, LEL (Volume %):	not applicable
Explosive Limits, UEL (Volume %):	not applicable
Flash Point (°C):	not applicable
Flammability (solid, gas):	not applicable

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: Stable Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid generating dust.

Incompatible Materials: Bases, acids, oxidizing materials, combustible materials.

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

Hazardous Decomposition: Thermal decomposition will produce miscellaneous decomposition products.

Hazardous Polymerization: Will Occur Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: Inhalation Skin Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: May cause irritation, lung damage, silicosis, and cancer.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Acute exposure to fine particles containing respirable cristobalite may result in discomfort and irritation; chronic inhalation of very high concentrations of finely divided crystalline silica dust, exposure ranging from a few weeks to 4 to 5 years, may cause a rapidly developing silicosis characterized by pulmonary insufficiency with severe dyspnea, violent coughing, tachypnea, weight loss, and cyanosis leading to the development of cor pulmonale and death within a relatively short period of time. A slow developing silicosis may result from exposure to relatively low levels of dust. Studies have shown that persons diagnosed with silicosis have an increased risk for developing lung cancer.

Skin Contact: May cause irritation due to mechanical abrasion.

Eye Contact: May cause irritation due to mechanical abrasion.

Ingestion: Effects of ingestion are due to mechanical action as crystalline silica is biologically inert.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified; no data available.

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

Serious Eye Damage/ Eye 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: Category 1

Listed as a Carcinogen/Potential Carcinogen Yes No

Silica dust, crystalline, in the form of quartz or cristobalite is listed by IARC, *Group 1, carcinogenic to humans*. Silica, crystalline is listed by NTP as a *known human carcinogen (respirable size)*. Cristobalite is not listed by OSHA as a designated carcinogen.

Reproductive Toxicity: Not classified.

Specific Target Organ Toxicity (STOT), Single Exposure: Not classified; no data available.

Specific Target Organ Toxicity (STOT), Repeated Exposure: Category 1
Cumulative exposure may result in reduced lung capacity and silicosis.

Aspiration Hazard: Not classified.

12. ECOLOGICAL INFORMATION

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.

13. DISPOSAL CONSIDERATIONS

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

14. TRANSPORTATION INFORMATION

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

15. REGULATORY INFORMATION

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: Yes.

FIRE: No.

REACTIVE: No.

PRESSURE: No.

State Regulations:

California Proposition 65: WARNING! This product contains a chemical [silica, crystalline (airborne particles of respirable size)] known to the state of California to cause cancer.

U.S. TSCA Inventory: Cristobalite is listed.

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

Canadian Regulations:

WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 22 May 2015

Sources: ChemAdvisor, Inc., SDS *Cristobalite*, 20 March 2015.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NIST	National Institute of Standards and Technology
ALI	Annual Limit on Intake	NRC	Nuclear Regulatory Commission
CAS	Chemical Abstracts Service	NTP	National Toxicology Program
CEN	European Committee for Standardization	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
CPSU	Coal Mine Dust Personal Sample Unit	REL	Recommended Exposure Limit
DOT	Department of Transportation	RM	Reference Material
EC50	Effective Concentration, 50 %	RQ	Reportable Quantity
EINECS	European Inventory of Existing Commercial Chemical Substances	RTECS	Registry of Toxic Effects of Chemical Substances
EPCRA	Emergency Planning and Community Right-to-Know Act	SARA	Superfund Amendments and Reauthorization Act
IARC	International Agency for Research on Cancer	SCBA	Self-Contained Breathing Apparatus
IATA	International Air Transportation Agency	SRM	Standard Reference Material
IDLH	Immediately Dangerous to Life and Health	STEL	Short Term Exposure Limit
ISO	International Organization for Standardization	STOT	Specific Target Organ Toxicity
LC50	Lethal Concentration, 50 %	TDLo	Toxic Dose Low
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
MSHA	Mine Safety and Health Administration	UEL	Upper Explosive Limit
NIOSH	National Institute for Occupational Safety and Health	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; or via the Internet at <http://www.nist.gov/srm>.