



# COCHISE COUNTY

## SILICA DUST SAFETY PROGRAM

### OSHA 29 CFR 1910.1053

COCHISE COUNTY ADMINISTRATIVE PROCEDURE

### Silica Dust Safety Program

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## 1. Scope

In accordance with OSHA 29 CFR 1910.1053, the County has established this Silica Dust Safety program to protect employees against the adverse effects of working with silica containing dust. This program applies to any employee working in environments where silica levels could approach the permissible exposure limit of silica.

## 2. Purpose

The purpose of this Silica Dust Safety Program is to provide the hazards associated with silica dust and outline the steps to take to ensure employees who work with or around silica are not exposed to hazardous levels of silica dust, and to provide procedures for common silica related work duties to minimize exposure in accordance with the OSHA Respirable Crystalline Silica standard (29 CFR 1910.1053).

Crystalline silica is a basic component of soil, sand, granite and many other minerals. Quartz is the most common form of crystalline silica. All materials containing silica can result in the presence of respirable silica particles when chipping, cutting, drilling, or grinding takes place. Silica exposure occurs through inhalation of silica containing particles and occurs through many construction and general industry methods. The most severe exposures generally occur during abrasive blasting with sand to remove paint and rust from bridges, tanks, concrete structures and other surfaces. Other activities that may result in severe silica exposure include jack hammering, rock/well drilling, concrete mixing, concrete drilling, brick and concrete cutting/sawing, tuck pointing and tunneling operations. Exposure to excessive silica dust over long periods of time can result in silicosis.

This Silica Dust Safety Program applies to all employees who are expected to be exposed to silica dust through the methods outlined above; or through other means, which are determined by their supervisor.

## 3. Responsibilities

### 3.1. Department Director/ Elected Official

- Oversee the silica dust safety program, ensuring that all program elements are fully implemented.
- Assign as Program Coordinator an employee(s) to be responsible for implementation of the silica dust safety in that department.
- Provide the Program Coordinator with adequate time and resources to implement the requirements of this program.
- Enforce compliance with this written program, including appropriate disciplinary action for any County employee failing to follow the requirements.

### 3.2. Program Administrator (County Risk & Safety Administrator)

- Establish the County's written silica dust safety program and revise as necessary.
- Coordinate an effective silica dust safety training program.
- Function as a resource for Program Coordinators on silica dust safety topics.
- Annually evaluate the effectiveness of the written program.

### 3.3. Departmental Program Coordinator (DPC)

- Understand the requirements of the silica dust safety program.
- Recognize areas and types of work that could produce silica dust.
- Ensure employees with responsibilities to work in areas where there is a risk of exposure to silica dust are trained in the program requirements; and
- Are provided appropriate personal protective equipment (PPE) when conducting such work.

### 3.4. Supervisors and Lead Staff

Supervisors and lead staff are responsible for ensuring that the silica dust safety program is implemented in their areas. In addition to being knowledgeable about the program

requirements for their own protection, they must also ensure that the program is followed by the employees under their charge. They must:

- Ensure that supervised employees (including new hires) receive appropriate training.
- Ensure the availability of appropriate PPE and equipment.
- Be aware of tasks that can produce silica dust.

### 3.5. Employees

Employees working in areas where there is an identified risk of silica dust exposure must be properly trained on all applicable elements of the silica dust safety program; and be provided and utilize the appropriate PPE for the task being performed.

## 4. Definitions

The following definitions are provided to allow for a better understanding of the Silica Dust Safety Program.

**Authorized person:** An employee who has received proper training and exposure monitoring to safely work with silica containing materials.

**Crystalline silica:** Naturally occurring component in earth soils, sand, granite, and many other minerals resulting in many building materials containing silica.

**Exposure Assessment:** The initial determination to find if any employee may be exposed to silica at or above the permissible exposure level (PEL). Until the assessment is completed, employees shall take all precautions necessary to maintain exposures below the PEL.

**HEPA:** High Efficiency Particulate Air. A filtering system capable of trapping and retaining at least 99.97% of all particles of 0.3 micron in diameter and larger.

**Permissible Exposure Limit:** (PEL) the OSHA limit for silica dust exposure. It is set at  $50\mu\text{g}/\text{m}^3$ , averaged over an 8-hour workday, as a TWA.

**Silica containing material:** Any material, which has the potential to contain silica at levels, which may pose a hazard to employees when the material is manipulated to create airborne particles

**Silicosis:** A lung disease caused by inhalation of silica dust. Silica dust can cause fluid buildup and scar tissue in the lungs that cuts down the ability for the lungs to fully function. The disease is not curable but can be prevented using protective systems.

## 5. Material Assessment

Any time there is a potential for silica containing materials to be involved in a project, sources of silica must be assessed prior to disturbing. Occupational Health and Safety, Department personnel, or an authorized contractor can perform building material assessments to determine silica content in materials.

Crystalline silica occurs naturally in the earth's crust and is a basic component of sand, concrete, brick, asphalt, granite, some blasting grit and wall spackling materials. Employees can be exposed to silica when conducting activities such as:

- Abrasive blasting
- Jack hammering
- Concrete crushing
- Hoe ramming
- Rock drilling
- Mixing of concrete or grout
- Concrete drilling
- Sawing concrete or bricks
- Chipping or scarifying concrete
- Rock crushing

- Moving or dumping piles of concrete, rock, or sand
- Demolition of concrete or brick
- Using coatings containing silica
- Removing coatings containing silica
- Pugging of clay- silica containing materials
- Chipping or scarifying concrete
- Rock crushing
- Moving or dumping piles of concrete, rock or sand
- Demolition of concrete or brick
- Using coatings containing silica
- Removing coatings containing silica

If airborne silica is expected to be generated during the project, Risk Management shall be contacted to set up exposure monitoring and ensure all safety precautions are followed to minimize exposure to airborne silica dust.

## 6. Exposure Monitoring

### 6.1. Initial Exposure Monitoring:

Supervisors whose work is of the type where County employees are expected to come in contact/work with silica containing materials where there is a risk of exposure through inhalation of dust should develop an exposure monitoring program.

Initial exposure monitoring should be Risk Management, or the Department involved to quantitatively evaluate the exposure to airborne silica.

Exposure monitoring should be conducted on any employee exposed to airborne silica dust as levels may vary based on job duty within a project. *For example, the employee performing concrete cutting versus an employee providing supervision during the work.*

### 6.2. Periodic Exposure Monitoring:

Whenever silica exposure levels are greater than, or equal to the Permissible Exposure Level ( $50\mu\text{g}/\text{m}^3$ ), periodic exposure monitoring is required. It is the responsibility of the affected department to work with Risk Management and develop a periodic exposure monitoring schedule.

The frequency of exposure monitoring should be as follows:

<u>Measured Concentration:</u>	<u>Monitoring Frequency:</u>
Permissible Exposure Level – $50\mu\text{g}/\text{m}^3$	Annual

Exposure monitoring is not required by every employee at risk of airborne silica exposure. Enough sampling must be done to enable the employee's exposure level to be reasonably represented.

### 6.3. Termination of Exposure Monitoring:

Periodic exposure monitoring may be discontinued if results from two consecutive sampling periods taken at least 7 days apart show that employee exposure is below the PEL.

#### 6.3.1. Sampling methods

Personal exposure monitoring will be conducted using an approved NIOSH method. Monitoring records shall include the following:

- The date, number, duration, location, and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable.
- A description of the sampling and analytical methods used.

- The type of respiratory protective devices, if any.
- Name and job classification of the employee monitored.
- Any environmental variables that could affect the measurement of the employee exposure.

### **6.3.2. Reporting of exposure monitoring results**

Risk Management will notify the department/supervisor of exposure monitoring results as soon as the final laboratory analysis is completed. The department/supervisor must provide this information to the affected employee(s) within 5 working days.

If levels are measured during the exposure monitoring exceeding the PEL, the Risk Management report will include steps and controls to reduce exposure to below the PEL.

Follow up exposure monitoring may be necessary if engineering or administrative controls are put in place to reduce hazardous exposures.

## **7. Exposure Control**

### **7.1. Pre-project planning**

Prior to projects taking place affecting buildings/facilities, the Department shall review planning documents to account for potential exposures to hazardous materials, including silica.

The Department can conduct building material assessments to make determinations if there are any silica containing materials, which may be impacted by the project.

During the planning process, any silica containing materials are addressed and methods for exposure control are provided prior to work beginning.

If silica containing materials are to be disturbed during the project, the appropriate exposure control methods will be recommended by the Department.

### **7.2. Administrative/Engineering Controls**

Where silica exposures at or above the Permissible Exposure Limit have been documented, or are expected, the appropriate engineering or administrative controls will be implemented, where feasible. Follow-up exposure monitoring may be necessary when administrative or engineering exposure controls are utilized:

- Substituting non-silica containing materials for use while abrasive blasting;
- Alternative methods such as pre-ordering grout already mixed instead of on-site mixing in bulk;
- Local exhaust ventilation;
- General ventilation;
- Vacuum methods with HEPA filters;
- Distance;
- Dust control products;
- Containment;
- Use of water to keep dust down;
- Wet saws to cut concrete;
- General work practices such as good housekeeping, worker rotation, development of specific SOPs to minimize exposure.

## **8. Personal Protective Equipment (PPE)**

In addition to administrative/engineering controls, employees may be required to wear specific PPE during the disturbance of silica containing materials and/or when airborne silica is present. The level of protection will depend on the task being conducted and the tools being utilized to complete the task.

Recommended PPE will typically include:

- Respiratory Protection;
- Disposable or reusable work clothing to keep from spreading the dust or taking the dust home;
- Leather gloves;
- Safety glasses or goggles;
- Face shield;
- Boot covers or rubber boots.

The following table provides recommended respiratory protection levels based on the measured or anticipated exposure levels:

Respirator	Protection Factor	Typical Silica Activity
N95	Less than 50 $\mu\text{g}/\text{m}^3$	- Used on voluntary basis to control low exposures
Half-face with HEPA filters	50 – 500 $\mu\text{g}/\text{m}^3$	- Housekeeping (wet method) - Saw cutting (wet method) - Drilling concrete (wet method)
Full-face with HEPA filters	500 – 5,000 $\mu\text{g}/\text{m}^3$	- Chipping concrete - Jack Hammering - Power tools without dust collection
SCBA	Above 5,000 $\mu\text{g}/\text{m}^3$	- Abrasive blasting

## 9. Housekeeping & Hygiene Facilities

In areas where silica containing dust may be present, all surfaces must be maintained free from accumulations of dust to minimize potential silica exposure. Dust and other silica containing debris must be removed from the work area as soon as possible.

Acceptable method of silica dust removal includes the use of HEPA vacuum or wet methods such as wet mopping.

Unacceptable methods of silica dust removal include dry sweeping, vacuum cleaners, shop vacuums, and compressed air.

Follow all recommended procedures and utilize recommended PPE during silica containing debris cleanup activities.

Where silica containing materials are used, impacted, or being removed; the following requirements must be met:

- PPE should be removed upon work completion and disposed of after each use.
- Employees must wash hands and are recommended to shower prior to leaving work.
- Ensure contaminated PPE, including footwear is not worn outside the work areas.

## 10. Medical Surveillance

Employees exposed to silica levels above the Permissible Exposure Limit (50  $\mu\text{g}/\text{m}^3$ ), or any employee working with silica who develops signs/symptoms of excessive exposure, should be enrolled in the Medical Surveillance Program.

All medical surveillance will be performed by Risk Management and results must be provided to the affected employee and their supervisor within 15 days of the assessment.

The medical surveillance program consists of baseline examination and chest X-ray.

Employees enrolled in the medical surveillance program should be examined annually to track any changes as a result to exposure to silica dust.

## 11. Training and Recordkeeping

Hazard Communication training is required by all covered Cochise County employees and should be conducted initially upon hiring.

Silica Awareness Training is available in person or online. This training must be offered to affected employees prior to working with silica and annually thereafter.

Silica awareness training should include the following:

- Information about the potential health effects and symptoms of exposure to respirable silica;
- Safety data sheets for silica, quartz, and applicable products containing silica;
- The purpose and set up of regulated areas to mark the boundaries of work areas containing silica dust;
- The use of engineering controls, work practices, good housekeeping and PPE to control exposure to silica;
- Use and care of PPE;
- Expected exposures to silica dust;
- Exposure monitoring process;
- Medical surveillance process.

If necessary, respiratory protection training, medical clearance, and quantitative fit testing is required under the Respiratory Protection Program. Contact Risk Management for additional information regarding enrollment in the program.

The supervisor is required to maintain all training, medical surveillance, and exposure monitoring results.

## 12. Signage

- 12.1. In areas where exposure to silica dust may exceed the PEL the following type of signage must be in place to warn employee of hazards.





**Table 1—Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica**

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
(i) Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade	None	None.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
(ii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	—When used outdoors	None	APF 10.
	—When used indoors or in an enclosed area	APF 10	APF 10.
(iii) Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None.
	Dust collector must provide the air flow recommended by the tool manufacturer, or		

	greater, and have a filter with 99% or greater efficiency		
(iv) Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	—When used outdoors	None	None.
	—When used indoors or in an enclosed area	APF 10	APF 10.
(v) Drivable saws	For tasks performed outdoors only:		
	Use saw equipped with integrated water delivery system that continuously feeds water to the blade	None	None.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
(vi) Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface	None	None.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system	None	None.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		

	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism		
	Use a HEPA-filtered vacuum when cleaning holes		
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only:		
	Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism	APF 10	APF 10.
	Use a HEPA-filtered vacuum when cleaning holes		
(ix) Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector	None	None.
	OR		
	Operate from within an enclosed cab and use water for dust suppression on drill bit	None	None.
(x) Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:		
	—When used outdoors	None	APF 10.
	—When used indoors or in an enclosed area	APF 10	APF 10.
	OR		
	Use tool equipped with commercially available		

	shroud and dust collection system		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism:		
	—When used outdoors	None	APF 10.
	—When used indoors or in an enclosed area	APF 10	APF 10.
(xi) Handheld grinders for mortar removal ( <i>i.e.</i> , tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system	APF 10	APF 25.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism		
(xii) Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface	None	None.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		

	OR		
	Use grinder equipped with commercially available shroud and dust collection system		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism:		
	—When used outdoors	None	None.
	—When used indoors or in an enclosed area	None	APF 10.
(xiii) Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface	None	None.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	OR		
	Use machine equipped with dust collection system recommended by the manufacturer	None	None.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide the air flow recommended by the manufacturer, or greater,		

	and have a filter with 99% or greater efficiency and a filter-cleaning mechanism		
	When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes		
(xiv) Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant	None	None.
	Operate and maintain machine to minimize dust emissions		
(xv) Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust	None	None.
	Operate and maintain machine to minimize dust emissions		
	For cuts of four inches in depth or less on any substrate:		
	Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust	None	None.
	Operate and maintain machine to minimize dust emissions		
	OR		
	Use a machine equipped with supplemental water spray designed to suppress dust.	None	None.

	Water must be combined with a surfactant		
	Operate and maintain machine to minimize dust emissions		
(xvi) Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points)	None	None.
	Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions		
	Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station		
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions	None None	None. None.
(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: Demolishing, abrading, or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions OR	None	None.
	When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab	None	None.