



# **SILICA DUST GUIDELINES**

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*Operating in California, Nevada, and Arizona*

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### **Hazard Identification**

We recognize that exposure to silica dust can cause silicosis (a deadly lung disease) and may cause lung cancer. We recognize that the following jobs/task can produce silica dust hazards at our workplace (sandblasting, concrete cutting, determine hazards for each site):

#### **Job Tasks:**

\_\_\_\_\_

\_\_\_\_\_

When any of these jobs/tasks are performed by a worker they will need to follow these guidelines. The Safety Coordinator, the superintendent or a designee is responsible for identifying silica dust exposure hazards.

### **Worksite Monitoring**

When a job/task is identified as a silica dust hazard, the process and the worker's breathing zone will be monitored for silica dust concentrations. Employee exposure measurements must represent actual breathing zone exposure conditions for each employee. Each job/task identified in part one will be monitored every four months and whenever a change is made to the process. Engineering controls will be monitored immediately after implementation and quarterly thereafter.

Employees will be able to view all air monitoring records; copies of the records can be found at our main office and our president or designee is responsible for the worksite monitoring program.

### **Employee Training**

All employees working in the jobs tasks identified above are required to complete training prior to working in the exposure area. Workers will be trained when first assigned to the job and annually thereafter.

Training will include the following topics:

1. Health hazards of silica dust exposure (including signs and symptoms of silicosis).
2. Operations and materials that can produce silica dust exposures.
3. Engineering and work practice controls used to protect them from exposures.
4. The importance of proper equipment and control maintenance.
5. Housekeeping procedures.
6. Proper use of respirators and our respirator program.
7. Personal hygiene procedures to reduce exposures.
8. How smoking increases the risk of developing silicosis and other lung damage.
9. The details of the Silica Dust Guidelines.

### **Housekeeping Procedures**

Dry sweeping and the use of compressed air are prohibited for removing dust in jobs/task identified in part one. Work areas and equipment covered by dust will be cleaned at the end of every shift by using a HEPA filter vacuum. Wet clean up may also be used to remove dust.

Waste material will be stored at designated areas depending on the jobsite and will be removed at least weekly. Superintendents are responsible for ensuring that work areas are free from dust at the end of each shift.

## **Engineering Controls**

We will use engineering controls whenever possible to control silica dust exposures. Ventilation systems will be inspected and maintained by our safety coordinator or designee.

Ventilation systems will be checked at least weekly to determine if they are functioning properly. We will not use abrasives that contain more than 1% crystalline silica during blasting operations. Our safety coordinator or designee is responsible for inspecting and maintaining engineering controls at all jobs/tasks identified in part one.

## **Personal Hygiene**

Employees working at the jobs/tasks identified will change out of contaminated clothing and work boots before leaving the jobsite. Contaminated clothing will be vacuumed with a HEPA filter vacuum to remove silica dust.

Employees should bring clean clothes if necessary and are required to wash their hands and shower (when feasible) before leaving the worksite.

When worksites are located in the field away from normal operation we will provide water in portable containers to hand washing. Employees will not eat, smoke, or use smokeless tobacco in areas identified.

## **Personal Protective Equipment**

When respirators are required to protect employees for silica dust exposure we will implement a Respiratory Protection Program which will be strictly followed.

## **Medical Surveillance**

Workers working in jobs/tasks identified will be given medical examinations to prevent the development of silicosis. Medical examination will be conducted once a year for employees working in jobs/tasks that expose them to silica dust.

Medical examination will include (1) Chest X-rays, (2) Pulmonary function tests, and (3) tuberculosis evaluation. Employees whose chest X-rays show changes consistent with the development of silicosis are customarily removed from jobs/tasks that expose them to silica dust. Input from the attending physician will be considered in making this decision.

Medical records are available at the main office.

## **Recordkeeping**

Training, medical records, air monitoring, and engineering control maintenance records will be kept at the main office.

## **Emergency First Aid Procedures for Silica Dust**

### *Eye Exposure*

If crystalline silica dust gets into the eyes, wash immediately with large amounts of water, lifting the lower and upper lids occasionally. If irritation is present after washing, get medical attention. Portable eyewashes will be kept at jobsites in the field away from the company locations.

### *Breathing*

If a person breathes in large amounts of crystalline silica dust, move the exposed person to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

### **Spill and Disposal Precautions**

If crystalline silica is spilled or released in hazardous concentrations, the following steps will be taken:

- Ventilate the area of the spill or release.
- Persons doing the clean-up are required to wear appropriate respirators.
- Collect spilled material in the most convenient and safe manner for reclamation or disposal in a secured sanitary landfill.

## **Silica Dust Exposure – Training/Review**

### **Introduction**

**Exposure to dust containing silica can cause silicosis, a progressive, irreversible, and sometimes fatal lung disease.** Every year more than one million American workers are exposed to silica dust at their jobs. Deaths from silicosis currently number about 300 cases per year. Hundreds more are being permanently disabled by this disease. Every one of these cases is an unnecessary tragedy, because silicosis is absolutely preventable.

If you work where dust containing silica is present, you need to know how to prevent this disease and save your life or other workers' lives.

### **Silica – “It’s not just dust”**

Crystalline silica, also called alpha silica or free silica, is silicon dioxide (SiO<sub>2</sub>). In pure, natural form, SiO<sub>2</sub> crystals are tiny, very hard, translucent, and colorless. Silica is the second most common mineral in the earth's crust and is a major component of sand, quartz, granite, and mineral ores.

The three most common types of crystalline silica encountered in industry are quartz, tridymite, and cristobalite. Silicates, composed of SiO<sub>2</sub>, are also a source of silica (usually less than 1%). Silicates include: mica, soapstone, talc, tremolite, and Portland cement. Quartz content can vary greatly among different rock types, for example: granite can contain anywhere from 10 to 40% quartz; shales have been found to average 22%, and sandstone average almost 70 % quartz.

### **Occupations at risk to silica exposure**

Any occupation where workers are handling rock, brick, sand, or drilling, quarrying, or tunneling through the earth's crust may expose workers to silica. Silica is present in almost every process where natural minerals are handled. Employers and workers in the following occupations can be exposed to silica dust in various levels. These are just a few examples.

- Construction: sandblasting, rock drilling, masonry work, jack hammering, tunneling, mixing dry cement, sanding drywall;
- Mining: cutting or drilling through sandstone and granite;
- Foundry work: grinding, moldings, shakeout, core room;
- Manufacturing of soaps and detergents;
- Shipyards: abrasive blasting;
- Rock crushing and transport: sand and gravel operations;
- Demolition of concrete and masonry structures;
- Dry sweeping or pressurized air blowing of concrete or sand dust;

- Ceramics, clay, and pottery;
- Stone cutting: sawing, abrasive blasting, chipping, grinding;
- Glass manufacturing;
- Agriculture;
- Railroads: setting and laying track;
- Manufacturing and use of abrasives;
- Cement and asphalt pavement manufacturing: concrete mixing, tunneling, and cutting;
- Paper and pulp mills: repair or replacement of linings of rotary kilns;
- Food processing operations: preparing crops for market, sorting, grading, and washing.

Workers encounter high-risk silica exposures through sandblasting, rock drilling, and mining. Workers who remove paint and rust from buildings, bridges, tanks, and other surfaces; clean foundry castings; work with stone or clay; etch or frost glass; and work in construction are at risk of overexposure to crystalline silica.

## **Health effects of silica dust**

### **Silicosis**

Silicosis is lung damage caused by breathing dust containing fine particles of crystalline silica. If silica particles are inhaled they become embedded in the lungs, the lung tissues react by developing fibrotic nodules and scarring around the trapped particles. The scar tissue makes the lungs hard and stiff. The scarring can greatly reduce the function of the lungs making it difficult and sometimes painful to breathe.

Not only does silica tear up the lungs but it also reduces the body's ability to fight off infections making workers more susceptible for developing other lung illnesses and infections. If workers smoke, silica exposure may greatly increase the risk of developing lung cancer. The incidence of tuberculosis is high among silicosis victims.

### **Symptoms of silicosis**

Early stages of the disease may go unnoticed. Early symptom of silicosis can include:

- Shortness of breath during physical exertion;
- Fever; and
- Occasionally bluish skin at the ear lobes or lips.

Progression of silicosis can lead to:

- Fatigue;
- Labored breathing;
- Loss of appetite;
- Pain in the chest; and
- Respiratory failure, which may cause death.

In severe cases, fibrous tissue can hinder the flow of blood in vessels of the lung and the heart can enlarge in an effort to pump more blood. Death can result from cardiopulmonary effects of chronic silicosis. Chronic silicosis, the most common form of the disease, may go undetected for years in the early stages. Chest x-rays may not reveal an abnormality until after 15 or 20 years of exposure. If you believe you are overexposed to silica dust, visit a doctor who knows about lung diseases. The progress of silicosis can only be stopped; but cannot be cured. Silica dust can also irritate worker's eyes. Goggles or safety glasses should be worn if eye irritation is a problem.

## **Control of Silica Dust Exposures.**

The key to preventing silicosis is preventing silica dust from being in the air. We are required to provide and assure the use of appropriate controls for dusts containing crystalline silica.

### **Engineering Controls**

To achieve compliance with the established PEL, we will first implement engineering controls or administrative controls whenever feasible.”

#### **1. Wet work**

- Airborne silica dust can be minimized or reduced by applying water to the process or clean up.
- When sawing or drilling concrete or masonry use saws/drills that provide water to the blade.

#### **2. Isolation**

- Use containment methods such as blast-cleaning cabinets when sandblasting.
- Cabs of vehicles or machinery cutting or drilling through rock that might contain silica should be enclosed and sealed.

#### **3. Ventilation**

- Use local exhaust systems to remove silica dust from industrial processes.
- Dilution ventilation may be used to reduce the silica dust concentration to below the PELs in large areas.
- Adequate measures should be taken to ensure that any discharge would not produce health hazards to the outside environment. A dust collector should be set up so that accumulated dust can be removed without contaminating work areas.
- Routinely maintain ventilation systems to keep them in good working condition.

#### **4. Dust Control**

- A vacuum with a high-efficiency particle air (HEPA) filter can be used to remove dust from work areas

#### **5. Substitution**

- Do not use silica sand or other substances containing more than 1% crystalline silica as abrasive blasting materials. Substitute with less hazardous materials.

### **Administrative Controls**

**1. Air Monitoring:** Air monitoring must be performed to determine exposures, evaluate engineering controls, selecting respiratory protection, evaluate work practices, and determine the need for medical surveillance.

- Exposure measurements should be made in the employee’s actual breathing zone.
- Any appropriate combination of long-term or short-term respirable samples is acceptable.
- Total sampling time must be at least 7 hours.
- Monitoring should be repeated at least quarterly.

**2. Training:** Workers should be trained in the following:

- The health effects of silica dust exposure;
- Operations and material that produce silica dust hazards;
- Engineering controls and work practice controls that reduce dust;
- The importance of maintenance and good housekeeping;
- The proper use of respirators and personal protective equipment;
- Personal hygiene practices to reduce exposure; and
- Details of our hazard communication and silica guidelines.

**3. Housekeeping:** Remove dust on overhead ledges, on floors, and equipment before it becomes

airborne due to traffic, vibration, and random air current.

- Never dry sweep or use compressed air for cleanup of dust that may contain silica.
- Use wet methods or vacuums with a HEPA filter for cleanup.
- Gentle wash down of surfaces is preferable if practical.

**4. Personal Hygiene:** Practice good personal hygiene to avoid unnecessary exposure.

- Hand-washing facilities should be conveniently located throughout a worksite in order to minimize worker contact
- Lockers should be provided for employees to store uncontaminated clothing.
- Workers should shower (if possible) and change out of work clothes contaminated with silica dust before they leave the jobsite. Wearing work clothes home covered in silica dust can expose the workers family to the hazard.
- Work clothes should not be cleaned by blowing or shaking. They should be vacuumed with a HEPA filter vacuum before removal.
- Locate eating/lunch areas away from exposed areas.
- Workers should park their cars where they will not be contaminated with silica.

**5. Restricted areas**

- Post warning signs in areas where silica exposure already exists or is possible.
- Unauthorized employees should not be allowed in restricted areas.
- Warning signs should contain the following information:

**6. Provide medical examinations**

- We will provide medical examinations for employees who may be exposed to respirable crystalline silica.
- Medical exams should include chest X-rays, pulmonary function tests, and tuberculosis test.
- Chest X-rays should be read by a specialist in dust diseases.
- Develop a plan for reducing exposures of employees whose X-rays show changes consistent with silicosis. Ordinarily, this is accomplished by removal from jobs or tasks involving crystalline silica exposure, but in some cases it may be accomplished by the effective use of supplied air respirators.

**7. Report cases**

- All cases of silicosis will be recorded the OSHA logs, as required.

**WARNING - SILICA DUST HAZARD SILICA DUST CAN CAUSE SILICOSIS**

**Respirators Required *Personal Protective Equipment***

Personal Protective Equipment (PPE) should only be used when engineering and administrative controls do not provide adequate worker protection and reduce the PELs below recommended limits. PPE is the last line of defense for fighting silicosis.

**Respiratory Protection**

Only when all engineering or administrative controls have been implemented, and the level of respirable silica still exceeds permissible exposure limits, we will rely on a respirator program to protect our workers.

- Select and provide an appropriate respirator that will effectively protect employees when abrasive blasting is done.
- Respirators must be approved by NIOSH for protection against the specific type of dust encountered.
- An abrasive-blasting respirator must cover the wearer's head, neck, and shoulders to protect from rebounding abrasives.