



# *Silica Dust Guidelines*

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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 jobs/tasks listed in Table 1 can produce silica dust hazards at our workplace.

When any of those jobs/tasks are performed by a worker they will need to follow the guidelines listed and if that is not possible we must do sampling, but as most tasks will not require respirators and if controls are followed no sampling will be required. Our designated competent person is Tony Nichols and is responsible for identifying silica dust exposure hazards.

### **Employee Training**

All employees working in the job 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:

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

### **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. Managers 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 director 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 director 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 if applicable. Contaminated clothing will be vacuumed with a HEPA filter

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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 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 if applicable. Medical examination will be conducted as required by the regulations.

Medical exams are at no cost to our employees and will be conducted in a convenient location if the employee will be expected to wear a respirator for 30 or more days per year due to silica exposure. The competent person for monitoring these guidelines needs to anticipate the number of days the employee is expected to wear a respirator in the coming year. Once taken, the exam is good for three years. After the exam, the employee gets a copy of the results and a copy of the physician's report.

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 or contact our competent person for more information.

### **Recordkeeping**

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

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

Review the safety data sheet with all employees making sure hazards, exposure, PPE, engineering controls and first aid sections are covered.

Eye Exposure

and at rest. Get medical attention as soon as possible. Always check the safety data sheet

### **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 Permissible exposure limit PEL 50-TWA 8-hour action level AL 25-TWA 8 hour, we will first implement engineering controls or administrative controls

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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.

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**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 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: Do Not Enter, Authorized Personnel Only.

**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 on 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 and AL's 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 (PEL 50-TWA 8 hour/AL 25-TWA 8 hour) still exceeds permissible exposure limits, we will rely on our respirator program to protect our workers.

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- Select and provide an appropriate respirator that will effectively protect employees when exposure to silica dust cannot be engineered out through control measures.
- Respirators must be approved by NIOSH for protection against the specific type of dust encountered.
- Some models have exhalation valves that can make breathing out easier and help reduce heat build-up. Note that N95 respirators with exhalation valves should not be used when sterile conditions must be maintained.
- The service life of all filters on NIOSH-approved respirators is limited by considerations of hygiene, damage, and breathing resistance. All filters should be replaced whenever they are damaged, soiled, or causing noticeably increased breathing resistance.
- Facemasks are not intended to be used more than once. If your mask is damaged or soiled, or if breathing through the mask becomes difficult, you should remove the facemask, discard it safely, and replace it with a new one. To safely discard your mask, place it in a plastic bag and put it in the trash. Wash your hands after handling the used mask.
- N95 respirators are manufactured for use in construction and other industrial type jobs that expose workers to dust and small particles.
- Always refer to the manufacturer’s requirements on proper use, storage, disposal and cleaning.

## 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 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 may be exposed to silica. Silica is present in almost every process where natural minerals are handled. Workers in the following occupations can be exposed to silica dust in various levels.

- Construction: sandblasting, rock drilling, masonry work, jack hammering, tunneling, mixing dry cement, sanding drywall;
- Manufacturing of soaps and detergents;
- Shipyards: abrasive blasting;
- Rock crushing and transport: sand and gravel

- Mining: cutting or drilling through sandstone and granite;
- Foundry work: grinding, moldings, shakeout, core room;
- Ceramics, clay, and pottery;
- Stone cutting: sawing, abrasive blasting, chipping, grinding;
- Glass manufacturing;
- Agriculture;
- Railroads: setting and laying track;
- Manufacturing and use of abrasives;
- Demolition of concrete and masonry structures;
- Dry sweeping or pressurized air blowing of concrete or sand dust;
- 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 founding 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 scare tissue makes the lungs hard and stiff. The scaring 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
- 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
- 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 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.








**Always read the Safety Data Sheet and follow manufacturer’s requirements**









**Steps to Protect Yourself from Crystalline Silica**



Take the following steps to protect yourself against exposure to crystalline silica:

- Participate in any medical surveillance, air monitoring, or training programs offered.
- Be aware that the highest silica concentrations may occur inside enclosed areas during concrete or masonry sawing or abrasive blasting.
- Change into disposable or washable work clothes at the jobsite.
- Do not eat, drink, use tobacco, or apply cosmetics in dusty areas.
- Wash hands and face before eating, drinking, or smoking outside dusty areas.
- Shower, if possible, and change into clean clothes before leaving the jobsite.
- Park in a location away from dusty operations, preferably upwind.
- When cleaning up or disposing of silica containing materials, use a method that does not reintroduce dust into the air.

**Table 1**

| Equipment/Task   | Engineering and Work Practice Control Methods  | Respirator Requirements and Minimum Assigned Protection Factor (APF) for 4 Hours or Less                   | Respirator Requirements and Minimum Assigned Protection Factor (APF) for More Than 4 Hours                 |
|--|--|--|--|
| Handheld power saws (any blade diameter)<br> | <ul style="list-style-type: none"> <li>• Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>• Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions:</li> </ul> |  |  |
|  | - When used outdoors   | (None required)  | <br>(APF 10 required) |
|  | - When used indoors or in an enclosed area   | <br>(APF 10 required) | <br>(APF 10 required) |
| Walk-behind saws<br>                         | <ul style="list-style-type: none"> <li>• Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>• Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions:</li> </ul> |  |  |
|  | - When used outdoors   | (None required)  | (None required)  |
|  | - When used indoors or in an enclosed area   | <br>(APF 10 required) | <br>(APF 10 required) |

| Equipment/Task  | Engineering and Work Practice Control Methods   | Respirator Requirements and Minimum Assigned Protection Factor (APF) for 4 Hours or Less                   | Respirator Requirements and Minimum Assigned Protection Factor (APF) for More Than 4 Hours                 |
|---|---|--|--|
|   |   | (APF 10 required)  | (APF 10 required)  |
| Handheld and stand-mounted drills (including impact and rotary hammer drills)<br><br> | <ul style="list-style-type: none"> <li>Use drill equipped with commercially available shroud or cowling with dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.</li> <li>Use a HEPA-filtered vacuum when cleaning holes.</li> </ul> | (None required)  | (None required)  |
| Jackhammers and handheld powered chipping tools<br><br>                             | Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:   |  |  |
|   | - When used outdoors  | (None required)  | <br>(APF 10 required) |
|   | - When used indoors or in an enclosed area  | <br>(APF 10 required) | <br>(APF 10 required) |
|   | OR  |  |  |
|   | <ul style="list-style-type: none"> <li>Use tool equipped with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism:</li> </ul>   |  |  |
|   | - When used outdoors  | (None required)  | <br>(APF 10 required) |
|   | - When used indoors or in an enclosed area  | <br>(APF 10 required) | <br>(APF 10 required) |

| Equipment/Task   | Engineering and Work Practice Control Methods  | Respirator Requirements and Minimum Assigned Protection Factor (APF) for 4 Hours or Less | Respirator Requirements and Minimum Assigned Protection Factor (APF) for More Than 4 Hours                 |
|--|--|--|--|
| Handheld grinders for uses other than mortar removal<br> | For tasks performed outdoors only: <ul style="list-style-type: none"> <li>• Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface.</li> <li>• Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.</li> </ul>   | (None required)  | (None required)  |
|  | OR   |  |  |
|  | <ul style="list-style-type: none"> <li>• Use grinder equipped with commercially available shroud and dust collection system.</li> <li>• Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.</li> <li>• 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:</li> </ul> |  |  |
|  | - When used outdoors   | (None required)  | (None required)  |
|  | - When used indoors or in an enclosed area   | (None required)  | <br>(APF 10 required) |