

# **A GUIDE TO WORKING SAFELY WITH SILICA**



**IF IT'S SILICA,  
IT'S NOT JUST  
DUST**

**U.S. Department of Labor  
National Institute for  
Occupational Safety and Health**

**Hotline  
1-800-35-NIOSH**

# A Message from the Secretary of Labor

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**To Concerned Workers and Employers:**

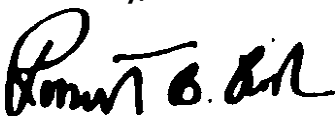
*Every year, more than 250 workers in the United States die with silicosis, an incurable, progressive lung disease caused by overexposure to dust containing silica. Hundreds more become disabled by this disease. Every one of these cases is an unnecessary tragedy, because silicosis is absolutely preventable.*

*If you work, or you are an employer, in one of the dozens of industries where dust containing silica is present, you need to know how to prevent this disease.*

*This guide — a cooperative effort between the Department of Labor and the National Institute for Occupational Safety and Health in the Department of Health and Human Services — explains how you can protect yourself and others each day on the job.*

*Sixty years ago, Labor Secretary Frances Perkins launched a nationwide effort to prevent silicosis. Great strides were made during this time period; however, there is still work to be done. I am determined to finish the job she started by working with labor, industry, and health professionals to put an end to this lung disease, once and for all.*

**Sincerely,**



**Robert B. Reich**

# What Do You Need to Know about Silicosis?

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## What is silicosis?

Silicosis is a disabling, nonreversible and sometimes fatal lung disease caused by overexposure to respirable crystalline silica. Silica is the second most common mineral in the earth's crust and is a major component of sand, rock and mineral ores. Overexposure to dust that contains microscopic particles of crystalline silica can cause scar tissue to form in the lungs, which reduces the lungs' ability to extract oxygen from the air we breathe. Typical sand found at the beach does not pose a silicosis threat.

Each year, more than 250 American workers die with silicosis. More than 1 million U.S. workers are exposed to crystalline silica. There is no cure for the disease, but it is 100 percent preventable if employers, workers and health professionals work together to reduce exposures.

In addition to silicosis, inhalation of crystalline silica particles has been associated with other diseases, such as bronchitis and tuberculosis. Some studies also indicate an association with lung cancer.

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There are three types of silicosis, depending upon the airborne concentration of crystalline silica to which a worker has been exposed:

*Chronic silicosis* usually occurs after 10 or more years of overexposure.

*Accelerated silicosis* results from higher exposures and develops over 5-10 years.

*Acute silicosis* occurs where exposures are the highest and can cause symptoms to develop within a few weeks or up to 5 years.

## **How do you know if you are at risk?**

Working in any dusty environment where crystalline silica is present potentially can increase your chances of getting silicosis. If a number of workers are working in a dusty environment and one is diagnosed with silicosis, the others should be examined to see if they might also be developing silicosis.

# Where Do You Find Silica Dust?

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Here are some examples of the industries and activities that pose the greatest potential risk for worker exposure:

- construction (sandblasting, rock drilling, masonry work, jack hammering, tunneling)
- 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
- shipyards (abrasive blasting)
- railroad (setting and laying track)
- manufacturing and use of abrasives
- manufacturing of soaps and detergents

More than 100,000 workers in the United States 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.

# What Are the Symptoms & Complications of Silicosis?

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Chronic silicosis, the most common form of the disease, may go undetected for years in the early stages; in fact, a chest X-ray may not reveal an abnormality until after 15 or 20 years of exposure. The body's ability to fight infections may be overwhelmed by silica dust in the lungs, making workers more susceptible to certain illnesses, such as tuberculosis. As silicosis progresses, you may exhibit one or more of the following symptoms:

- shortness of breath following physical exertion
- severe cough
- fatigue
- loss of appetite
- chest pains
- fever

## **How can you determine if you have silicosis?**

If you believe you are overexposed to silica dust, visit a doctor who knows about lung diseases. A medical examination that includes a complete work history, a chest X-ray, and lung function test is the only sure way to determine if you have silicosis. NIOSH recommends that medical examinations occur before job placement or upon entering a trade, and at least every 3 years thereafter.

# What Can Workers Do to Prevent Silicosis?

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- ✓ Work with your employer to prevent silicosis at your worksite.
- ✓ Use engineering controls installed by your employer to reduce silica dust levels, and make sure they are properly maintained. Tell your employer when they aren't working properly.
- ✓ Minimize dust by following good work practices, such as removing dust with a water hose or vacuum with a high-efficiency particulate filter rather than blowing it clean with compressed air, or by wet sweeping instead of dry sweeping.
- ✓ Suggest to your employer to substitute less hazardous materials than crystalline silica for abrasive blasting.
- ✓ Wear, maintain, and correctly use approved particulate respirators when engineering controls alone are not adequate to reduce exposures below permissible levels. Beards and mustaches interfere with the respirator seal to the face, making most respirators ineffective.
- ✓ If you must sandblast, use type CE positive pressure abrasive blasting respirators.



- ✓ Participate in air monitoring, medical surveillance, and training programs offered by your employer or when required by law.
- ✓ Talk to your employer, employee representative, or union if you are concerned about the dust in your workplace. Ask for the results of air sampling done at your worksite. You may also contact the Occupational Safety and Health Administration (OSHA) or the Mine Safety and Health Administration (MSHA). See pages 12-19 for phone numbers.

*As a reminder, whenever you work with toxic materials, it is always a sound practice to:*

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Change into disposable or washable work clothes at your worksite, if possible; shower, where available; and change into clean clothing before leaving your worksite.

Avoid eating, drinking, or using tobacco products in work areas where there is dust or other toxic materials.

Wash your hands and face before eating or drinking.



# What Can Employers Do to Prevent Silicosis?

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- ✓ Make a commitment to prevent silicosis at your worksites.
- ✓ Comply with OSHA and MSHA regulations on respirable crystalline silica. If your employees are overexposed, reduce exposure levels through the use of engineering controls. While these controls are being installed, or if they are being repaired, provide appropriate respiratory protection.
- ✓ Perform air monitoring of worksites as needed, and when required by law, and take corrective action when silica levels are excessive. Monitoring provides a basis for:
  - selecting and ensuring the effectiveness of engineering controls
  - selecting proper respiratory protection
  - seeing if work practices to reduce dust levels are effective
  - determining if a medical surveillance program is necessary.



✓ Install and maintain engineering controls to eliminate or reduce the amount of silica in the air and the build-up of dust on equipment and surfaces. Examples of controls include: exhaust ventilation and dust collection systems, water sprays, wet drilling, enclosed cabs, and drill platform skirts. Practice preventive maintenance because the extreme abrasiveness of the silica dust can damage the systems you install.

✓ Substitute less hazardous materials than crystalline silica for abrasive blasting, when possible. Try to use automatic blast cleaning machines or cabinets that allow operating the machines from outside using gloved arm-holes.

✓ Supply vacuums with high-efficiency particulate air (HEPA) filters, and advise employees to vacuum, hose down, or wet-sweep work areas, instead of dry sweeping.

✓ Train workers about health effects, engineering controls and work practices that reduce dust, the importance of maintenance and good housekeeping, as well as on the proper type and fitting of respirators. Make sure they know what operations and materials present a silica hazard.

# What Employers Can Do...

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- ✓ Establish a written respiratory protection program. Outfit employees with appropriately selected, properly fitted, approved respirators when engineering controls alone are insufficient to keep exposures within safe levels. Be sure respirators are kept clean and properly maintained and that employees are trained in their use.
- ✓ Provide medical examinations for employees who may be exposed to respirable crystalline silica, as recommended by NIOSH, and have X-rays read by a specialist in dust diseases. Develop a plan for reducing exposures of employees whose X-rays show changes consistent with silicosis.
- ✓ Report all cases of silicosis to state health departments and to MSHA, and record cases on OSHA logs, as required.
- ✓ Post warning signs to identify work areas where respirable silica is present.

# What OSHA and MSHA Regulations Apply?

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OSHA enforces a permissible exposure limit, which is the maximum amount of airborne crystalline silica that an employee may be exposed to during an eight-hour work shift. MSHA enforces its own exposure limits, has rules requiring controls for drills, and requires air sampling in certain situations.

Other relevant OSHA and MSHA regulations include: respiratory protection, posting of warning signs, housekeeping, recordkeeping or reporting of occupational illnesses, abrasive blasting, personal protective equipment, and training. OSHA has rules on hazard communication, safety and health programs in construction, and access to employee exposure and medical records.

***A reminder to both workers and employers:***

The American Lung Association recommends quitting smoking for better lung health. Call 1-800-LUNG-USA for more information.

# Where Can You Get More Information on Preventing Silicosis?

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Call 1-800-35-NIOSH. Select option 2, then option 5 for a complete package of information on silicosis prevention.

For free help in establishing or improving your safety and health program, small businesses can contact the OSHA Consultation Program in their state.

## OSHA Consultation Program Directory

State	Telephone
Alabama	(205) 348-3033
Alaska	(907) 269-4957
Arizona	(602) 542-5795
Arkansas	(501) 682-4522
California	(415) 972-8515
Colorado	(970) 491-6151
Connecticut	(860) 566-4550
Delaware	(302) 761-8219
District of Columbia	(202) 576-6339
Florida	(904) 488-3044
Georgia	(404) 894-2643
Guam	(671) 475-0136
Hawaii	(808) 586-9100
Idaho	(208) 385-3283



<b>State</b>	<b>Telephone</b>
Illinois	(312) 814-2337
Indiana	(317) 232-2688
Iowa	(515) 281-5352
Kansas	(913) 296-7476
Kentucky	(502) 564-6895
Louisiana	(504) 342-9601
Maine	(207) 624-6460
Maryland	(410) 333-4210
Massachusetts	(617) 727-3982
Michigan	(517) 332-8250(H) (517) 322-1809(S)
Minnesota	(612) 297-2392
Mississippi	(601) 987-3981
Missouri	(314) 751-3403
Montana	(406) 444-6418
Nebraska	(402) 471-4717
Nevada	(702) 486-5016
New Hampshire	(603) 271-2024
New Jersey	(609) 292-3923
New Mexico	(505) 827-4230
New York	(518) 457-2481
North Carolina	(919) 662-4644

*(H) - Health*  
*(S) - Safety*

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## OSHA

### State

### Telephone

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North Dakota	(701) 328-5188
Ohio	(614) 644-2246
Oklahoma	(405) 528-1500
Oregon	(503) 378-3272
Pennsylvania	(412) 357-2561
Puerto Rico	(809) 754-2188
Rhode Island	(401) 277-2438
South Carolina	(803) 734-9614
South Dakota	(605) 688-4101
Tennessee	(615) 741-7036
Texas	(512) 440-3834
Utah	(801) 530-6868
Vermont	(802) 828-2765
Virginia	(804) 786-6613
Virgin Islands	(809) 772-1315
Washington	(360) 902-5638
West Virginia	(304) 558-7890
Wisconsin	(608) 266-8579(H) (414) 521-5188(S)
Wyoming	(307) 777-7786

*(H) - Health*

*(S) - Safety*



For compliance assistance or technical support in construction, maritime, and general industries, contact the nearest OSHA Regional Office.

Region I  
(CT,\* MA, ME, NH, RI, VT\*)  
JKF Federal Building  
Room E-340  
Boston, MA 02203  
Telephone: (617) 565-9860

Region II  
(NJ, NY,\* PR,\* VI\*)  
201 Varick Street  
Room 670  
New York, NY 10014  
Telephone: (212) 337-2378

Region III  
(DC, DE, MD,\* PA, VA,\* WV)  
Gateway Building, Suite 2100  
3535 Market Street  
Philadelphia, PA 19104  
Telephone: (215) 596-1201

Region IV  
(AL, FL, GA, KY,\* MS, NC, SC,\* TN\*)  
1375 Peachtree Street, N.E.  
Suite 587  
Atlanta, GA 30367  
Telephone: (404) 347-3573





## OSHA

Region V  
(IL, IN,\* MI,\* MN,\* OH, WI)  
230 South Dearborn Street  
Room 3244  
Chicago, IL 60604  
Telephone: (312) 353-2220

Region VI  
(AR, LA, NM,\* OK, TX)  
525 Griffin Street  
Room 602  
Dallas, TX 75202  
Telephone: (214) 767-4731

Region VII  
(IA,\* KS, MO, NE)  
City Center Square  
1100 Main Street, Suite 800  
Kansas City, MO 64105  
Telephone: (816) 426-5861

Region VIII  
(CO, MT, ND, SD, UT,\* WY\*)  
1999 Broadway, Suite 1690  
Denver, CO 80202-5716  
Telephone: (303) 844-1600



Region IX  
(American Samoa, AZ,\* CA,\* Guam,  
HI,\* NV,\* Trust Territories of the Pacific)  
71 Stevenson Street  
Room 420  
San Francisco, CA 94105  
Telephone: (415) 975-4310

Region X  
(AK,\* ID, OR,\* WA\*)  
1111 Third Avenue  
Suite 715  
Seattle, WA 98101-3212  
Telephone: (206) 553-5930

\*These states and territories operate their own OSHA-approved job safety and health programs (Connecticut and New York plans cover public employees only). States with approved programs must have a standard that is identical to, or at least as effective as, the federal standard.



## MSHA

In the mining industry, for compliance assistance, technical support, educational materials, or for information about an inspection, contact the nearest MSHA district office.

## COAL MINING

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District 1  
Wilkes-Barre, PA  
(717) 826-6321

District 7  
Barbourville, KY  
(606) 546-5123

District 2  
Hunker, PA  
(412) 925-5150

District 8  
Vincennes, IN  
(812) 882-7617

District 3  
Morgantown, WV  
(304) 291-4277

District 9  
Denver, CO  
(303) 231-5458

District 4  
Mt. Hope, WV  
(304) 877-3900

District 10  
Madisonville, KY  
(502) 821-4180

District 5  
Norton, VA  
(540) 679-0230

District 11  
Birmingham, AL  
(205) 290-7300

District 6  
Pikeville, KY  
(606) 432-0944



## **METAL AND NONMETAL MINING**

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Northeast District  
Cranberry Township, PA  
(412) 772-2333

Southeast District  
Birmingham, AL  
(205) 290-7294

North Central District  
Duluth, MN  
(218) 720-5448

South Central District  
Dallas, TX  
(214) 767-8401

Rocky Mountain District  
Denver, CO  
(303) 231-5465

Western District  
Vacaville, CA  
(707) 447-9844

## **MSHA HEADQUARTERS**

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Health Division (Coal)  
(703) 235-1358

Health Division (Metal and Nonmetal)  
(703) 235-8307

# Silicosis Prevention Partners

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*If It's Silica, It's Not Just Dust*, the campaign to end silicosis, is a joint effort of the U.S. Department of Labor's Occupational Safety and Health Administration and Mine Safety Administration and the U.S. Department of Health and Human Services' National Institute for Occupational Safety and Health.

## **Occupational Safety and Health Administration**

OSHA's mission is to protect the health and safety of workers in the nation's 6 million workplaces and reduce workplace hazards through common sense at work.

## **Mine Safety and Health Administration**

MSHA enforces safety and health standards to protect miners from work-related injuries, illnesses, and death at all U.S. mines and mineral processing operations. The agency helps mine operators who have special compliance problems, and makes available technical, educational, and other types of assistance.

## **National Institute for Occupational Safety and Health**

NIOSH, a branch of the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, coordinates research and makes recommendations for preventing work-related illnesses and injuries.

NIOSH has produced three alerts on silicosis: *Preventing Silicosis and Deaths from Sandblasting*, *Preventing Silicosis and Deaths from Rock Drilling*, and *Preventing Silicosis and Deaths in Construction Workers*. For a free copy, call 1(800) 35-NIOSH.