

SILICA AWARENESS



DEPARTMENT OF LABOR AND INDUSTRY





Contents

- What is silica?
- What are its health hazards?
- What are the human exposure limits?
- Where is it used or found in construction?
- How can it be controlled?
- What about respirators?



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What is Silica?

Silica is Quartz

Quartz (silica) is found naturally in almost all rock, sand and soil.



It is also found in concrete products and bricks.



It is sometimes found in sandblasting (abrasive blasting) grit and is called "silica sand".





Silica Health Hazards

Inhaled silica dust scars the lungs

A lung disease called “**silicosis**” is caused by breathing of dust containing silica.

The dust causes “**fibrosis**” or scar tissue formation in the lungs.

This reduces the lung’s ability to extract oxygen from the air.

There is no cure.



Silica Health Hazards

What are the symptoms of silicosis?

Early stages go unnoticed.

Continued exposure results in shortness of breath during exercise.

Prolonged high exposure can lead to extreme shortness of breath, chest pain, respiratory failure and death.



Silica Health Hazards

Other Health Effects

- Susceptibility to other lung diseases and infections such as tuberculosis.
- Acute silicosis may develop after very short periods of high exposure.
- Chronic silicosis develops after many years of lower levels of exposure.





Crystalline Silica Standard in Construction, 1926.1153

Brief Overview of Standard

- (a) Scope and Application
- (b) Definitions
- (c) Specific Exposure Control Methods
- (d) Alternative Exposure Control Methods
- (e) Respiratory Protection



Crystalline Silica Standard in Construction, 1926.1153

Brief Overview of Standard

- (f) Housekeeping
- (g) Written Exposure Control Plan
- (h) Medical Surveillance
- (i) [Training] Communication of Respirable Crystalline Silica Hazard to Employees
- (j) Dates



Silica Exposure Limits

Is there a safe limit for silica?

The safest amount of silica in the air is zero.

This is the legal limit set by VOSH/OSHA.

The legal limit is called a “permissible exposure limit” or “PEL”.

This limit is for respirable (fine) dust.

In the air – 50 micrograms per cubic meter (PEL)

Action Level – 25 micrograms per cubic meter

Rule-of-thumb: if dust containing silica is visible in the air, it's almost always over the permissible limit.



Silica Exposure in Construction

Silica is found in many construction jobs



- Rock drilling
- Abrasive blasting (sand blasting)
- Concrete & masonry building construction
- Earthwork and rock crushing
- Masonry or concrete building demolition
- Road construction and repair



Silica Exposure – Rock Drilling



Drilling without water

Your actual exposure will depend on the wind, where you stand and if you use water to control the dust.

Rock drilling without water produces large amounts of dust.



Drilling with water



Silica Exposure in Construction Concrete Work

Jack-hammering



Generates moderate to heavy amounts of dust

Power sanding



Generates heavy amounts of dust



Silica Exposure –Concrete Highway work



Generates moderate amounts of dust



Silica Exposure – concrete cutting without water



Generates large amounts of dust



Silica Exposure – brick and cinder block cutting



Without water



With water

Generates moderate to heavy amounts of dust without water.



Silica Exposure - Tuckpointing



Generates heavy amounts of dust without water



Silica Exposure – cutting concrete siding with power saws

On some new construction, a lightweight concrete siding (hardiplank) is being used.

Cutting this siding with a power saw without water or ventilation can result in silica overexposure.





The Risk of Silica Exposure

- When dust is controlled, exposures are low.
- When dust is uncontrolled, exposures are high.
- Many exposures are for short time periods, but at very high concentrations.
- Short, high exposure can still exceed permissible limits and cause lung damage.



Silica dust exposure can be controlled by use of water or exhaust ventilation



Using water to cut concrete and bricks



Concrete sander with exhaust ventilation



Silica Exposure Control

Avoid dry sweeping and use of compressed air on concrete



Both these activities can stir up large amounts of dust.
Use a vacuum with high efficiency filters when possible.



Our Worksite control measures

Water or exhaust ventilation is required on the following jobs or tasks:

- **Cutting, drilling, grinding or chipping concrete or masonry.**
- **Cutting, or sanding drywall or plaster.**
- **Cleaning after any of the above tasks.**



Silica and Use of Respirators

Respirators must be used if silica dust can't be controlled with water or ventilation

either



Air-purifying respirator with dust cartridge

or



Supplied air respirator



Our worksite respirator requirements

Respirators are required for the following jobs or tasks:

- **Cutting, drilling, grinding or chipping concrete or masonry.**
- **Cutting, or sanding drywall or plaster.**
- **Cleaning after any of the above tasks.**

Unless the hazard is otherwise mitigated



Respirators Must Fit Properly

Respirators must fit properly to prevent leaks around the edges.

Fit-testing must be done before first wearing a respirator.

Facial hair **not allowed** when wearing a respirator.*

*does not apply for PAPR





Employees using respirators must be trained

Training is required by VOSH for anyone who wears a respirator.

If you don't know how to use a respirator properly, you may think your respirator is providing protection when it is not.



Silica in Construction Quiz

Question 1

Where is silica found?

- a) In polluted air in big cities.
- b) In concrete, bricks and sand.
- c) In certain chemicals.



Silica in Construction Quiz

Question 2

Why is dust containing silica so dangerous?

- a) Because it can cause permanent damage to the lungs.
- b) It can make it hard to see.
- c) It can get in your eyes and damage them.



Silica in Construction - Quiz

Question 3

Why must you be clean-shaven to wear some respirators?

- a) The respirator will slide off a beard.
- b) We want a clean-cut look in this company.
- c) Some respirators will leak even with short stubble.
- d) Beards interfere with breathing through a respirator.



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