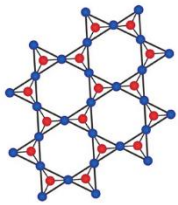


North Risk Partners- Respirable Crystalline Silica Exposure Control



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Respirable Crystalline Silica Exposure Control

- Numerous organizations are impacted by OSHA's new crystalline silica standards for general industry and construction. Use of crystalline silica in production and various construction activities attracts OSHA's attention, and overexposure can cause disabling disease and stimulate workers' compensation claims.
- By educating your team and employees about the current standards and necessary control measures, you help your organization prevent employee illnesses, protect human resources, and remain violation free.



Respirable Crystalline Silica Exposure Control

Objectives:

1. Review the new OSHA Standards 1910.1053 & 1926.1153
2. Introduction to a crystalline silica control program
3. Understanding the hazards of exposure
4. Tasks where exposure is encountered
5. Review Table 1 from the Standard
6. Competent person
7. Personal protective devices, engineering controls
8. Air-borne monitoring
9. Medical surveillance
10. SDSs and technical bulletins
11. Labeling and signs
12. Other communications – training



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Respirable Crystalline Silica Exposure Control

The New OSHA Standards 1910.1053 & 1926.1153

- Federal Standards
 - ✓ Reduces the permissible exposure limit (PEL) for respirable crystalline silica to 50 micrograms per cubic meter of air, averaged over an 8-hour shift.
 - ✓ Requires employers to: use engineering controls (such as water or ventilation) to limit worker exposure to the PEL; provide respirators when engineering controls cannot adequately limit exposure; limit worker access to high exposure areas; develop a written exposure control plan, offer medical exams to highly exposed workers, and train workers on silica risks and how to limit exposures.
 - ✓ Provides medical exams to monitor highly exposed workers and gives them information about their lung health.
 - ✓ Provides flexibility to help employers - especially small businesses - protect workers from silica exposure.
- State OSHA Plans Adopted without Changes (e.g. MN OSHA)



Respirable Crystalline Silica Exposure Control

Introduction to the Crystalline Silica Exposure Control Program

1. Protect the health of employees
2. Meet the various OSHA standard requirements



Respirable Crystalline Silica Exposure Control

Background and History:

The U.S. Department of Labor first highlighted the hazards of respirable crystalline silica in the 1930s, after a wave of worker deaths. The department set standards to limit worker exposure in 1971, when OSHA was created.

PELs remained in place for many years and were outdated.

Final rule proposed in September 2013.



Respirable Crystalline Silica Exposure Control

OSHA Compliance Schedule:

Both standards contained in the final rule take effect on June 23, 2016, after which industries have ~ 1 1/2 to five (5) years to comply with most requirements, based on the following schedule:

Construction - June 23, 2017, one year after the effective date.

General Industry and Maritime - June 23, 2018, two years after the effective date.

Hydraulic Fracturing - June 23, 2018, two years after the effective date for all provisions except Engineering Controls, which have a compliance date of June 23, 2021.



Respirable Crystalline Silica Exposure Control

Understanding the Hazards of Respirable Crystalline Silica Exposure

1. What is crystalline silica?
2. How does it enter the body?
3. What are the adverse health effects of overexposures?
4. What type of operations can generate harmful crystalline exposures?

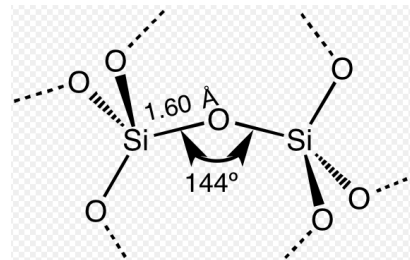


Respirable Crystalline Silica Exposure Control

Respirable Crystalline Silica or Silicon Dioxide - SiO_2 is an important industrial material found abundantly in the earth's crust.

Quartz, the most common form of respirable crystalline silica, is a component of of:

- Sand
- Stone
- Rock
- Concrete
- Brick
- Block
- Mortar



Materials containing quartz are found in a wide variety of workplaces.

Other forms include: cristobalite and tridymite.

Amorphous silica, such as silica gel, is not respirable crystalline silica.

Respirable Crystalline Silica Exposure Control

How does Respirable Crystalline Silica enter the body?

- Respirable Crystalline Silica dust is hazardous when very small (respirable) particles are inhaled.
- That is when the particulates are suspended in the air and enter the lungs and are not removed or “expectorated” by the lungs and the protective escalatory system.
- These respirable dust particles can penetrate deep into the lungs and cause disabling and sometimes fatal lung diseases, including silicosis and lung cancer, as well as kidney disease.



Respirable Crystalline Silica Exposure Control

What are the adverse health effects of overexposures?

Respirable Crystalline Silica has been classified as a human lung carcinogen.

Breathing respirable crystalline silica dust can cause silicosis.
In severe cases can be disabling or fatal.

The respirable crystalline silica dust enters the lungs which:

- Causes the formation of scar tissue
- Reduces the lungs' ability to take in oxygen

There is no cure for silicosis.

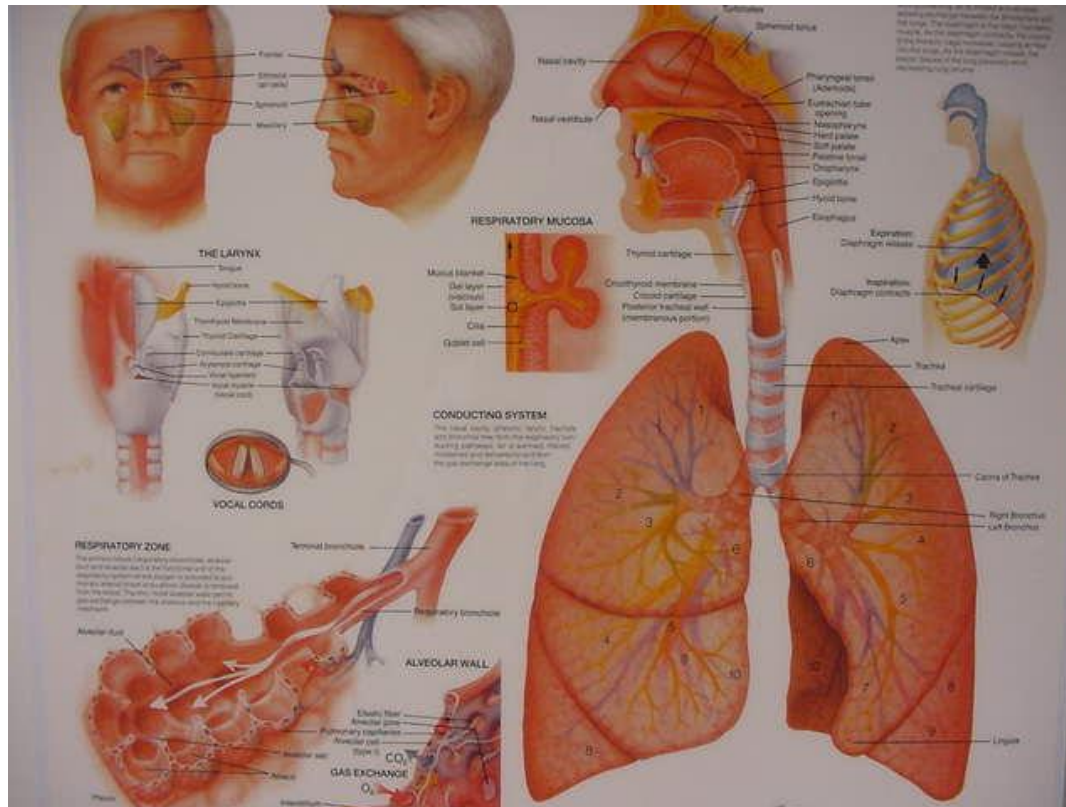
It makes one more susceptible to lung infections like tuberculosis.

Smoking causes lung damage and adds to the damage.



Respirable Crystalline Silica Exposure Control

What are the adverse health effects of overexposures?



Respirable Crystalline Silica Exposure Control

What type of operations can generate harmful crystalline exposures?

Respirable crystalline silica is very small particles typically at least 100 times smaller than ordinary sand found on beaches or playgrounds.

Occupational exposure to respirable crystalline silica occurs when cutting, sawing, drilling, and crushing of:

- Concrete
- Brick
- Ceramic tiles
- Rock
- Stone products



Respirable Crystalline Silica Exposure Control

Polling Question #1

Where do your employees encounter crystalline silica exposures?

- A. Outdoors while cutting concrete
- B. Indoors while drilling concrete in relation to plumbing, electrical work
- C. Indoors and outdoors during maintenance work
- D. I don't know
- E. A, B and C



Respirable Crystalline Silica Exposure Control

Tasks where respirable crystalline exposure is encountered (precursor to Table 1):

This includes:

- Cutting, sawing, drilling, and crushing of concrete, brick, ceramic tiles, rock, and stone products;
- During abrasive blasting with sand;
- Operations that process or use large quantities of sand, such as foundries and;
- Operations in the glass, pottery and concrete products industries.



Worker using a walk-behind saw with an integrated water delivery system to cut asphalt roadway.

Photo courtesy of OSHA.



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Respirable Crystalline Silica Exposure Control

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
(ii) Handheld power saws (any blade diameter)	<p>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <ul style="list-style-type: none"> ▪ When used outdoors. ▪ When used indoors or in an enclosed area. 	<p>None</p> <p>APF 10</p>	<p>APF 10</p> <p>APF 10</p>



Respirable Crystalline Silica Exposure Control

Table 1 from Standard

Employers need to:

- Review Table 1 of the Standard to determine which of the listed tasks are completed by employees.
- For each job task that employees conduct that is listed on Table 1, review if the equipment/task complies with the required listed engineering and work practice control methods.



Worker drilling horizontal holes in concrete slab with a dowel drilling rig. The shroud surrounds the drill steel where it enters the concrete and the dust collector is the canister on the right. Worker is wearing respiratory protection.

Photo courtesy of NIOSH.



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Respirable Crystalline Silica Exposure Control

Table 1 from Standard cont.

- Create a list of tasks and equipment that are not listed in Table 1 which are performed/used by employees that potentially create exposure to respirable crystalline silica.
- For these tasks/equipment, we as the employer are required to prove that no employee is exposed to levels of silica above the PEL: $50 \mu\text{g}/\text{m}^3$



Respirable Crystalline Silica Exposure Control

Table 1 from Standard cont.

- For tasks not included on Table 1 or in circumstances where the control methods outlined in Table 1 are not implemented; the employer must conduct an exposure assessment by either using historical data or objective data to characterize the exposure or by conducting scheduled monitoring.



Respirable Crystalline Silica Exposure Control

Polling Question #2

How do you plan to control potential employee exposures to respirable crystalline silica in your work plan?

- A. Drill, cut, or saw concrete, brick, and stone only while wet
- B. Utilize general dilution ventilation, wind and limit the time of exposure to only a few minutes
- C. Employee use of respirators
- D. I don't know
- E. A, B and C as listed in Table 1 tasks



Respirable Crystalline Silica Exposure Control

Competent Person

..an individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them. The competent person must have the knowledge and ability necessary to fulfill the responsibilities set forth in paragraph (g) of 29 CFR 1926.1153.

Program needs to designate the competent person(s) to manage **(enforce)** the exposure control plan and make frequent and regular inspections of tasks as they relate to silica exposure.



Respirable Crystalline Silica Exposure Control

Competent Person - Specifics:

Requires at a minimum 3 hours training

One hour silica and 2 hours additional training

Number of competent persons required per job (as outlined in the preamble)

Number of Competent Persons	Employees at Jobsite
1	< 20
5	20 - 499
10	> 500



Respirable Crystalline Silica Exposure Control

Engineering Controls:

- Consult with vendors and/or manufactures to purchase equipment with required engineering controls installed as outlined in Table 1.

TABLE 1: Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica			
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Respirable Crystalline Silica Exposure Control

Engineering Controls - cont.

For tasks performed indoors or in enclosed areas, provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;

For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;

Specific requirements for measures implemented that include an enclosed cab or booth on equipment.



Respirable Crystalline Silica Exposure Control

Engineering Controls - cont.



Vehicle-mounted drilling rig using water on the drill bit. The enclosed operator's cab is on the right.

Photo courtesy of NIOSH.



Worker milling granite floor indoors with milling machine and dust collection system (background).

Photo courtesy of OSHA.



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Respirable Crystalline Silica Exposure Control

Respirators and Personal Protective Devices/Equipment (PPE)

- Determine the typical daily exposure for each employee conducting a task or using equipment as outlined in Table 1. (Table 1 separates recommendations based on tasks being conducted either less than or greater than 4 hours)
- Determine the location of the task or usage of equipment. (Table 1 outlines different recommendations based on use of equipment indoors or outdoors)



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Respirable Crystalline Silica Exposure Control

Respirators and Personal Protective Devices/Equipment (PPE) - cont.

- Review the applicable requirements for respiratory protection as outlined in Table 1.
- Review the exposure assessment results to determine required respiratory protection for tasks/equipment not listed on Table 1.
- Include employees required to wear respiratory protection in the company's Respiratory Protection Program (29 CFR 1910.134).



Respirable Crystalline Silica Exposure Control

Housekeeping

No dry sweeping or dry brushing.

Do not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:

...Allowed if no alternative method is feasible



Respirable Crystalline Silica Exposure Control

Air-Borne Monitoring

- Conducted in the breathing zone with a filter/cyclone assembly and a properly calibrated air pump
- Samples are sent to an accredited laboratory for analysis
- Only NIOSH, OSHA sampling methods are used (e.g. Appendix A of 29 CFR 1926.1153.)



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Respirable Crystalline Silica Exposure Control

Air-Borne Monitoring

Scheduled monitoring option

A) Perform initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, in each work area(job knowledge).

B) If initial monitoring indicates that employee exposures are below the action level, may discontinue monitoring for those employees whose exposures are represented by such monitoring.

(C) Where the most recent exposure monitoring indicates that employee exposures are at or above the action level but at or below the PEL, the employer shall repeat such monitoring within 6 months of the most recent monitoring



Respirable Crystalline Silica Exposure Control

Air-Borne Monitoring - cont.

(D) Where the most recent exposure monitoring indicates that employee exposures are above the PEL, employer shall repeat such monitoring within 3 months of the most recent monitoring.

(E) Where the most recent (non-initial) exposure monitoring indicates that employee exposures are below the action level, employer shall repeat such monitoring within 6 months of the most recent monitoring until 2 consecutive measurements, taken 7 or more days apart, are below the action level, at which time may discontinue monitoring for those employees whose exposures are represented by such monitoring, except as otherwise provided in paragraph (d)(2)(iv) of 1926.1153.

*Employee notification of assessment results (A) Within 5 working days, (B) Above the PEL, describe in the written notification the corrective action being taken to reduce employee exposure to at or below the PEL.



Respirable Crystalline Silica Exposure Control

Air-Borne Monitoring - cont.

Reassessment of exposures

Assess exposures when:

- Change in the production process, control equipment, or personnel
- Work practices may result in new or additional exposures at or above the action level,
- The employer has reason to believe that new or additional exposures at or above the action level



Respirable Crystalline Silica Exposure Control

EMPLOYEE NOTIFICATION OF EXPOSURE MONITORING RESULTS FOR RESPIRABLE CRYSTALLINE SILICA

To: Tony Baloney

From: Joe Schmoie

Date: 11/19/17

On 11/1/17 (date) Respirable Crystalline Silica exposure monitoring was performed in your work area.

Your airborne Respirable Crystalline Silica exposure was determined to be 54 ug/m³ (microns per cubic meter) TWA (Time Weighted Average). Your exposure is OVER / UNDER the OSHA permissible level of 50 ug/m³ TWA. Your exposure is OVER / UNDER the OSHA action level of 25 ug/m³ TWA. If your exposure is over the permissible exposure level you are required to use personal protective equipment as required by the Respirable Crystalline Silica Exposure Control Program and participate in the medical surveillance program as directed by 29 CFR 1926.1153 or 1910.1053 (as applicable) and your supervisor. The results of Respirable Crystalline Silica exposure monitoring in my work area have been presented to me, I have been advised of the Respirable Crystalline Silica exposure control plan, and I have been instructed in the proper use of personal protective equipment and other control measures to prevent Respirable Crystalline Silica exposure.

Employee Signature: Tony Baloney Date: 11/19/17

Supervisor Signature: Joe Schmoie Date: 11/19/17



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Respirable Crystalline Silica Exposure Control

Medical Surveillance

Employer shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for each employee based on the following:

- Construction task and/ or operations:

Employees who will need to wear respiratory protection for 30 or more days per year.

- General Industry tasks and operations:

Employees who will be occupationally exposed to respirable silica at or above the action level for 30 or more days per year.

- Employees can decline to be included in the medical surveillance program.



Respirable Crystalline Silica Exposure Control

Medical Surveillance - cont.

Written Medical Report:

- Written medical report for the employee (complete info)
- The PLHCP's written medical opinion for the employer
Less detail, employee provides permission for additional information.



Respirable Crystalline Silica Exposure Control

SDSs and Technical Bulletins - Right to Know/Hazcomm Training

The program details hazard communication/training related to crystalline silica exposures

SDS and archive MSDSs are made available



Respirable Crystalline Silica Exposure Control

Labeling and Signs

Program includes a description of procedures used to restrict access to work areas as a means to limit the number of people exposed (This includes exposures produced by other employers)



Respirable Crystalline Silica Exposure Control

Labeling and Signs - cont.

As applicable all regulated areas will be labeled with signs as follows:

**DANGER
CRYSTALLINE SILICA
CANCER HAZARD
CAUSES LUNG DAMAGE
AUTHORIZED PERSONNEL ONLY
RESPIRATORS REQUIRED**



Respirable Crystalline Silica Exposure Control

Labeling and Signs-cont.

Containers, systems, piping containing respirable crystalline silica will be labeled with signs as follows:

**DANGER
CONTAINS CRYSTALLINE SILICA
CANCER HAZARD
CAUSES LUNG DAMAGE**



Respirable Crystalline Silica Exposure Control

Other Communications

Employee has access to labels and SDS's for silica

Training must cover the hazards associated with silica including: cancer, lung effects, immune system effects, and kidney effects.



Respirable Crystalline Silica Exposure Control

Other Communications - cont.

Employees must be able to demonstrate knowledge and understanding on the following:

- The health hazards associated with exposure to respirable crystalline silica
- The specific tasks in the workplace that produce exposure to silica
- The measures the employer has implemented to protect employees from exposure: engineering controls, work practices, and respirators



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Other Communications - cont.

- The appropriate silica standard
- Who the competent person is onsite
- The purpose of the medical surveillance program



Respirable Crystalline Silica Exposure Control

Recordkeeping

- Air monitoring data (date of monitoring, tasks monitored, number of samples, results, identity of lab, PPE worn, name, **social security number**, and job classification of the employees monitored)
- Objective data (the material monitored, source of data, testing protocol, results of testing, tasks/activities monitored, other relevant data)
- Medical surveillance data (must be available to the employee to transfer to other employers)



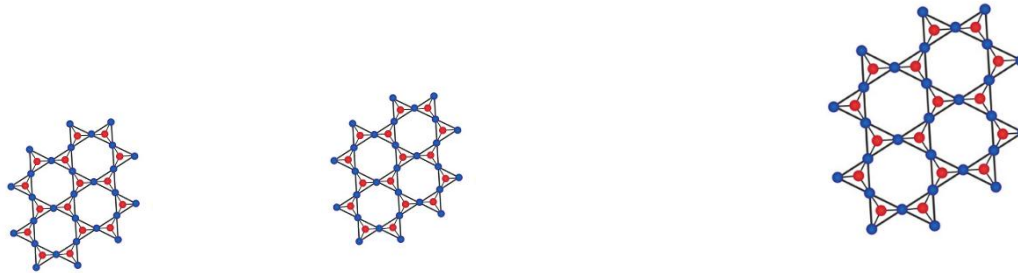
Respirable Crystalline Silica Exposure Control

Recordkeeping - cont.

- Training records will be typically maintained by Human Resources. All records of training will be maintained for a minimum of three (3) years beyond the training date.
- Exposure monitoring and medical surveillance records (including those externally generated) will be maintained for 30 years.
- Exposure monitoring records are available for employee review and for the area director upon request.
- Medical surveillance records are available for the affected employee and for the area director upon request.



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Questions??

