

Silica:

Regulatory Update

11/08/2018

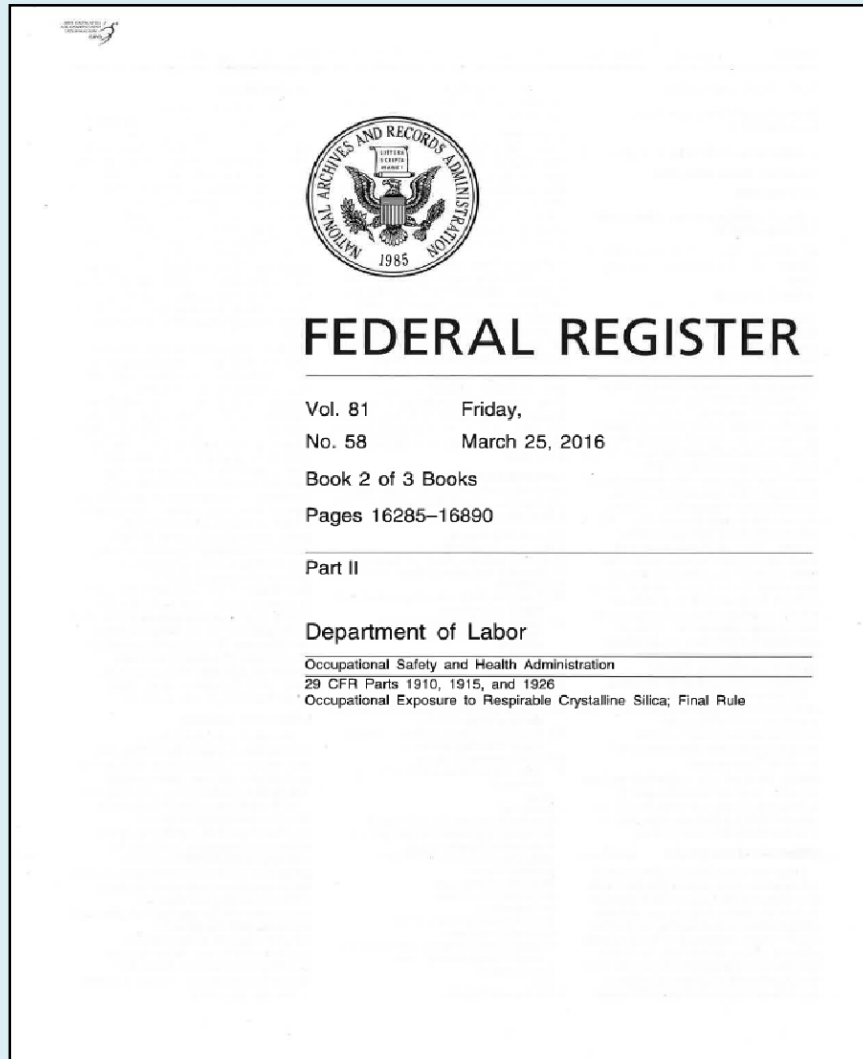
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Silica: Regulatory Update



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What is Crystalline Silica?

- Common mineral found in:
 - Sand
 - Concrete
 - Stone
 - Mortar
- Found in many natural occurring materials used in industrial products and construction sites

Industries & Operations with Exposures

- Construction
- Glass manufacturing
- Pottery products
- Structural clay products
- Concrete products
- Foundries
- Dental laboratories
- Paintings and coatings
- Jewelry production
- Refractory products
- Asphalt products
- Landscaping
- Ready-mix concrete
- Cut stone and stone products
- Abrasive blasting in:
 - Maritime work
 - Construction
 - General industry
- Refractory furnace installation and repair
- Railroads
- Hydraulic fracturing for gas and oil

Should I lose my life, making a living?

Inhaling very small or “respirable” crystalline silica particulates has been linked to:

- Silicosis (incurable lung disease);
- Lung cancer;
- Chronic obstructive pulmonary disease; and
- Kidney disease



Healthy Lung



Silicotic Lung

Who is at Risk from Exposure?

- Potentially YOU.
- Approximately 2.3 million workers on the job
- Hazard = specific activities create respirable silica dust
- Examples: High-energy operations
 - Cutting, crushing, sawing, grinding
 - Drilling and crushing stone, rock, brick, block/mortar
 - Using industrial sand
 - Abrasive blasting with sand
 - Sanding or drilling into concrete walls
 - Manufacturing brick, concrete blocks, or ceramic products
 - Foundries, and many others...

Reasons for the Rule

- Current exposure limits are based on research from the 1960s or before
- Current PELs do not adequately protect worker health
- Silica exposure $< 100 \mu\text{g}/\text{m}^3$ has been found to cause:
 - Lung cancer
 - Silicosis
 - Kidney disease
- Respirable crystalline silica = human carcinogen
- In 2014, deaths from silicosis $>$ death by fire/caught by collapsing material, such as trench

Health Benefits with New Rule

OSHA estimates that once the effects of the rule are fully realized, it will prevent:

- More than 600 deaths per year
 - Lung cancer: 124
 - Silicosis and other non-cancer lung diseases: 325
 - End-stage kidney disease: 193
- More than 900 new silicosis cases per year

How will the New Rule Protect Me?

- Requires engineering controls
 - Ventilation or wet methods
- Reduce exposure to silica with restricted areas
- New permissible exposure limit (PEL) for all workplaces covered by the standard:
 - 50 micrograms of respirable crystalline silica per cubic meter of air ($\mu\text{g}/\text{m}^3$) averaged over an 8-hr day
- Even lower action level:
 - 25 micrograms of respirable crystalline silica per cubic meter of air ($\mu\text{g}/\text{m}^3$) averaged over an 8-hr day

Construction Standard

(a) Scope

(b) Definitions

(c) Specified exposure control methods

OR

(d) Alternative exposure control methods

PEL

Exposure Assessment

Methods of Compliance

(e) Respiratory protection

(f) Housekeeping

(g) Written exposure control plan

(h) Medical surveillance

(i) Communication of silica hazards

(j) Recordkeeping

Construction Scope

- All occupational exposures to respirable crystalline silica are covered, unless employee exposure will remain below $25 \mu\text{g}/\text{m}^3$ as an 8-hr TWA under any foreseeable conditions.

Definitions

- Permissible Exposure Limit (PEL) = $50 \mu\text{g}/\text{m}^3$ as an 8-Hour TWA
- Action Level = $25 \mu\text{g}/\text{m}^3$ as an 8-Hour TWA

Specified Exposure Control Methods

- Table 1 in the construction standard matches 18 tasks with effective dust control methods and, in some cases, respirator requirements.
- Employers that fully and properly implement controls on Table 1 do not have to:
 - Comply with the PEL
 - Conduct exposure assessments for employees engaged in those tasks

Example of Table 1 Entry

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum APF	
		≤ 4 hr/shift	> 4 hr/shift
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade.		
	<p>Operate and maintain tool in accordance with manufacturers' instruction to minimize dust</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>

Example of Table 1 Entry

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum APF	
		≤ 4 hr/shift	> 4 hr/shift
Stationary masonry saws	<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>	None	None

Example of Table 1 Entry

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum APF	
		≤ 4 hr/shift	> 4 hr/shift
Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector.	None	None
	<p>OR</p> <p>Operate from within an enclosed cab and use water for dust suppression on drill bit.</p>	None	None

Examples of Air-purifying Respirators



**Half mask Filtering Facepiece
Dust mask**
APF=10
Needs to be fit tested

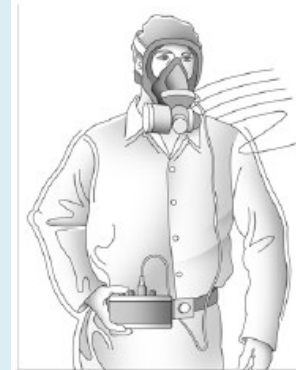


Half mask Elastomeric Respirator
APF=10
Needs to be fit tested



Full Facepiece Elastomeric Respirator
APF=50
Needs to be fit tested

Original illustrations created by Attilis & Associates



**Tight-Fitting Full Facepiece
Powered Air-Purifying Respirator
(PAPR)**
APF=1,000
Needs to be fit tested



**Tight-Fitting Half Facepiece
Powered Air-Purifying Respirator
(PAPR)**
APF=50
Needs to be fit tested

List of Table 1 Entries

- Stationary masonry saws
- Handheld power saws
- Handheld power saws for fiber cement board
- Walk-behind saws
- Drivable saws
- Rig-mounted core saws or drills
- Handheld and stand-mounted drills
- Dowel drilling rigs for concrete
- Vehicle-mounted drilling rigs for rock and concrete
- Jackhammers and handheld powered chipping tools
- Handheld grinders for mortar removal (tuckpointing)
- Handheld grinders for other than mortar removal
- Walk-behind milling machines and floor grinders
- Small drivable milling machines
- Large drivable milling machines
- Crushing machines
- Heavy equipment and utility vehicles to abrade or fracture silica materials
- Heavy equipment and utility vehicles for grading and excavating

Fully & Properly Implementing Controls Specified on Table 1

- Presence of controls is not sufficient.
- Employers are required to ensure that:
 - Controls are present and maintained
 - Employees understand the proper use of those controls and use them accordingly

Employees Engaged in Table 1 Tasks

- Employees are “engaged in the task” when operating the listed equipment, assisting with the task, or have some responsibility for the completion of the task
- Employees are not “engaged in the task” if they are only in the vicinity of a task

Respiratory Protection Requirements on Table 1

- Respirators required where exposures above the PEL are likely to persist despite full and proper implementation of the specified engineering and work practice controls
- Where respirators required, must be used by all employees engaged in the task for entire duration of the task
- Provisions specify how to determine when respirators are required for an employee engaged in more than one task

Alternative Exposure Control Method

- Required if employee exposures are or may reasonably expected to be at or above action level of 25 $\mu\text{g}/\text{m}^3$
Action Level = 25 $\mu\text{g}/\text{m}^3$ as an 8-Hour TWA
- Exposures assessments can be done following:
 - The performance option
 - The scheduled monitoring option

Performance Option

- Exposures assessed using any combination of air monitoring data or objective data sufficient to accurately characterize employee exposure to respirable crystalline silica

What is Objective Data?

- Air monitoring data from industry-wide surveys
- It demonstrates employee exposure associated with a particular:
 - product
 - material
 - process
 - task
 - activity
- **MUST REFLECT WORKPLACE CONDITIONS CLOSELY OR WITH A HIGHER EXPOSURE POTENTIAL**

Scheduled Monitoring Option

- Prescribes a schedule for performing initial and periodic personal monitoring
- Perform initial monitoring to assess 8-hr TWA exposure
 - 1 or more personal breathing zone samples
 - Exposures of employees:
 - On each shift
 - For each job classification
 - In each work area
 - Sample EE expected to have the highest exposure
 - Where several employees perform same task/shift/work area, employer may sample a representative fraction of these EE.

Scheduled Monitoring Option

- If monitoring indicates:
 - Initial below the AL: no additional monitoring
 - Most recent at or above the AL: repeat within 6 months
 - Most recent above the PEL: repeat within 3 months
 - When two consecutive non-initial results, taken 7 or more days apart, are below the AL, monitoring can be discontinued
 - Reassess if circumstances change

Appendix A: Methods of Sample Analysis

- Employers must ensure that samples are analyzed by a laboratory that follows the procedures in Appendix A
- Appendix A specifies methods of sample analysis
 - Allows for use of OSHA, NIOSH, or MSHA methods
 - Analysis must be conducted by accredited laboratories that follow specified quality control procedures

Employee Notification of Assessment Results

- Within 5 working days of completing exposure assessment:
 - Notify EE of results in writing or,
 - Post the results in an appropriate location accessible to all EE
- Whenever assessment indicates exposure > PEL:
 - Employer shall describe in written notification the corrective action to reduce exposure to or below the PEL

Hierarchy of Controls

- Engineering controls and/or work practice controls to reduce exposures to or below the PEL.
- Wherever these are not sufficient, the employer shall nonetheless use them to reduce EE exposure to the lowest feasible level.
- Respirators permitted where engineering/work practice controls are not sufficient.

Respiratory Protection

- Must comply with 29 CFR 1910.134
- Respirators required for exposures:
 - While installing or implementing controls or work practices
 - For tasks not listed in Table 1 or when Table 1 is not fully and properly implemented
 - Where the PEL is exceeded during tasks such as maintenance and repair
 - When all feasible engineering and work practice controls are implemented but are not sufficient

Housekeeping

- When it can contribute to exposure, employers must not allow:
 - Dry sweeping or brushing
 - Use of compressed air for cleaning surfaces or clothing, unless it is used with ventilation to capture the dust
- Those methods can be used if no other methods like HEPA vacuums, wet sweeping, or use of ventilation with compressed air are feasible

Written Exposure Control Plan (WECP)

- The plan must describe:
 - Description of tasks involving exposure to respirable crystalline silica
 - Description of engineering controls, work practices, and respiratory protection for each task
 - Description of housekeeping measures used to limit exposure
 - Description of procedures used to restrict access to work areas when necessary (including exposures generated by other employers or sole proprietors)
- Must be made readily available upon request

Construction - Competent Person

- Construction employers must designate a competent person to implement the WECP.
- *Competent person* is an individual capable of identifying existing and foreseeable respirable crystalline silica hazards, who has authorization to take prompt corrective measures.
- Makes frequent and regular inspection of job sites, materials, and equipment to implement the WECP.
- Review and evaluate effectiveness of WECP annually and update it as necessary.

Medical Surveillance

- Employers must offer medical examinations to workers:
 - Who will be exposed above the action level for 30 or more days a year
 - No cost to EE; Reasonable time and place
 - Medical examinations shall be performed by PLHCP
- Exam includes medical and work history, physical exam, chest X-ray, and pulmonary function test (TB test on initial exam only)
- Employers must offer examinations every three years to workers who continue to be exposed above the trigger or if recommended by PLHCP

1926.1153(h)(1)(i)

- The employer shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for each employee who will be required under this section to use a respirator for 30 or more days per year.

Does the standard require employers to count any day during which an employee is required to use a respirator, for any amount of time, as a day of respirator use for purposes of applying the 30-day trigger for medical surveillance?

- Yes. If an employee is required by the standard to use a respirator at any time during a given day, regardless of the duration of the respirator use, that day counts as one day toward the 30-day threshold for medical surveillance. Thus, a "day" of respirator use for purposes of the 30-day threshold does not mean a *full* day of respirator use.

https://www.osha.gov/dsg/topics/silicacrystalline/construction_info_silica.html

Information Provided to PLHCP

- Copy of the standard 1926.1153
- Description of EE's former, current, and anticipated job duties as they relate to occupational exposure of respirable crystalline silica
- Description of levels of occupational exposure
- Description of PPE
- Information of records of previous work-related medical examinations

Medical Opinion

- Worker receives report with detailed medical findings within 30 days of medical examination
- PLHCP explains to EE the results of examination
- Employer receives a written medical opinion within 30 days of medical examination
 - Date of examination
 - Statement that the examination has met the requirements of this section
 - Any recommended limitations on the EE's use of respirators
 - With EE written consent: recommended limitations on exposure and recommendation to see a specialist if deemed appropriate

Communication of Hazards

- Employers required to comply with hazard communication standard (HCS) (29 CFR 1910.1200)
- Address: Cancer, lung effects, immune system effects, and kidney effects as part of HCS
- Train workers on health hazards, tasks resulting in exposure, workplace protections, and purpose/description of medical surveillance program
- Identify the competent person
- Make HazCom information readily available upon request

Recordkeeping

- Must maintain records per 29 CFR 1910.1020 for:
 - Air monitoring data
 - Exposure records maintained and made available per 1910.1020
 - Objective data
 - Medical surveillance program
 - For each EE covered
 - Name and SSN#
 - Copy of PLHCP & specialist medical opinions
 - Copy of information provided to PLHCP & specialists
 - Medical records maintained and made available per 1910.1020

Training

- Train workers on work operations & ways to limit exposure
- Housekeeping
 - Restricting practices that expose workers to silica where feasible alternatives are available

Engineering Controls

Grinding stone
without engineering controls



Polishing stone using water to
control the dust

Engineering Controls

Grinding without engineering controls



Grinding using a vacuum dust collector

Engineering Controls

Jackhammer use without engineering controls



Jackhammer use with water spray to control dust

Timeline for Compliance

- September 23, 2017
 - Engineering controls shall be in effect
 - Comply with all obligations of standard (except AL trigger for medical surveillance)
- June 23, 2018
 - Exposure assessments
 - Offer medical examinations to EE exposed at or above PEL for 30 or more days
- June 23, 2020
 - Offer medical examinations to EE exposed at or above AL for 30 or more days

“Short-Term Guidelines”

Some employees in the construction sector perform tasks involving occasional, brief exposures to respirable crystalline silica that are incidental to their primary work. These workers include carpenters, plumbers, and electricians who occasionally drill holes in concrete or masonry or perform other tasks that involve exposure to respirable crystalline silica. Where employees perform tasks that involve exposure to respirable crystalline silica for a very short period of time, exposures for many tasks will be below $25 \mu\text{g}/\text{m}^3$ as an 8-hour TWA. For

example, for hole drillers using hand-held drills, if the duration of exposure is 15 minutes or less, the 8-hour TWA exposure can reasonably be anticipated to remain under the $25 \mu\text{g}/\text{m}^3$ threshold (assuming no exposure for the remainder of the shift), and the standard would not apply.

This exception for situations where exposures are not likely to present significant risk to workers allows employers to focus their resources on exposures of greater occupational health concern.

Iowa OSHA Consultation & Education

Additional information www.OSHA.gov/silica

OSHA Consultation & Education

Provide air quality monitoring at no cost



Did you really find this use listed in the operator's manual?

Questions?

