



Annual Workplace Safety and Health Conference

Silica: Regulatory Update



Reasons for the Rule

- Current permissible exposure limits (PELs) are formulas that many find hard to understand
- Construction/shipyards PELs are obsolete particle count limits
- General industry formula PEL is about equal to $100 \mu\text{g}/\text{m}^3$; construction/shipyards formulas are about $250 \mu\text{g}/\text{m}^3$



Most Important Reason for the Rule

- Current PELs do not adequately protect workers
- Extensive epidemiologic evidence that lung cancer and silicosis occur at exposure levels below 100 $\mu\text{g}/\text{m}^3$



Workers and Industries Affected

- 2.3 million workers:
 - Construction: 2 million
 - GI/Maritime: 300,000
- 676,000 establishments
 - Construction: 600,000
 - GI/Maritime: 76,000



Exposure and Health Risks

Exposure to respirable crystalline silica has been linked to:

- Silicosis;
- Lung cancer;
- Chronic obstructive pulmonary disease; and
- Kidney disease



Healthy Lung



Silicotic Lung



Scope of Coverage

- Three forms of silica: quartz, cristobalite, and tridymite
- Exposures from chipping, cutting, sawing, drilling, grinding, sanding, and crushing of concrete, brick, block, rock, and stone products (such as in construction operations)
- Exposures from using sand products (such as glass manufacturing, foundries, and sand blasting)



Industries and 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



Respirable Crystalline Silica Rule

- Three standards:
 - General industry
 - Maritime
 - Construction
- Similar to other OSHA health standards and American Society for Testing and Materials (ASTM) consensus standards



General Industry/Maritime Standard

- Scope
- Definitions
- Permissible exposure limit (PEL)
- Exposure assessment
- Regulated areas
- Methods of compliance
 - Engineering and work practice controls
 - Written exposure control plan
- Respiratory protection
- Housekeeping
- Medical surveillance
- Communication of silica hazards
- Recordkeeping
- Dates



General Industry/Maritime - Scope

- All occupational exposures to respirable crystalline silica are covered, unless objective data shows exposures remain below $25 \mu\text{g}/\text{m}^3$ as an 8-hr time-weighted average (TWA) under any foreseeable conditions.
- Agricultural operations and exposures resulting from processing of sorptive clays are not covered.
- General industry employers can follow the construction standard in some very limited circumstances.



Permissible Exposure Limit (PEL)

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



Exposure Assessment

- Required if exposures are or may reasonably be expected to be at or above action level of 25 $\mu\text{g}/\text{m}^3$
- 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



Objective Data

- Includes air monitoring data from industry-wide surveys or calculations based on the composition of a substance.
- It demonstrates employee exposure associated with a particular product or material or a specific process, task, or activity.
- Must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.



Scheduled Monitoring Option

- Prescribes a schedule for performing initial and periodic personal monitoring
- If monitoring indicates:
 - Initial below the action level AL: no additional monitoring
 - Most recent at or above the AL: repeat within six months
 - Most recent above the PEL: repeat within three months
 - When two consecutive non-initial results, taken seven 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



General Industry/Maritime – Regulated Areas

- Required where exposures can reasonably be expected to exceed the PEL
- Must be demarcated in any manner that limits workers in the area
- Must post warning signs at entrances
- Respirator use required



Methods of Compliance – Hierarchy of Controls

- Employers can use any engineering or work practice controls to limit exposures to the PEL
- Respirators permitted where PEL cannot be achieved with engineering and work practice controls



Engineering Controls

Grinding stone
without engineering controls



Polishing stone using water to
control the dust



General Industry/Maritime – Written Exposure Control Plan

- The plan must describe:
 - Tasks involving exposure to respirable crystalline silica
 - Engineering controls, work practices, and respiratory protection for each task
 - Housekeeping measures used to limit exposure



Respiratory Protection

- Must comply with 29 CFR 1910.134
- Respirators required for exposures above the PEL:
 - While installing or implementing controls or work practices
 - For tasks where controls or work practices are not feasible
 - When feasible controls cannot reduce exposures to the PEL
 - While in a regulated area (General Industry/Maritime)



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



General Industry/Maritime – Medical Surveillance

- Employers must offer medical examinations to workers:
 - Who will be exposed above the action level for 30 or more days a year
- Employers must offer examinations every three years to workers who continue to be exposed above the trigger
- Exam includes medical and work history, physical exam, chest X-ray, and pulmonary function test (TB test on initial exam only)



Medical Opinion

- Worker receives report with detailed medical findings
- Employer receives an opinion that only describes limitations on respirator use, and if the worker gives written consent, recommendations on:
 - Limitations on exposure to respirable crystalline silica, and/or
 - Examination by a specialist



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 medical surveillance.



Recordkeeping

- Must maintain records per 29 CFR 1910.1020 for:
 - Air monitoring data
 - Objective data
 - Medical records



General Industry/Maritime – Compliance Dates

- Effective date is 90 days after publication in *Federal Register*
- Employers must comply with all requirements of the standard by two years after the effective date, except :
 - Employers must comply with the action level trigger for medical surveillance four years after the effective date. (The PEL is the trigger from two through four years after the effective date.)
 - Hydraulic fracturing operations in the oil and gas industry must implement engineering controls to limit exposures to the new PEL five years after the effective date.



Construction

- Scope
- Definitions
- Specified exposure control methods
- OR**
- Alternative exposure control methods
 - PEL
 - Exposure Assessment
 - Methods of Compliance
- Respiratory protection
- Housekeeping
- Written exposure control plan
- Medical surveillance
- Communication of silica hazards
- Recordkeeping
- Dates



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.



Construction – 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



Fully and 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



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
Hand-held power saw (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade.		
	Operate and maintain tool in accordance with manufacturers' instruction to minimize dust		
	- When used outdoors	None	APF 10
	- When used indoors or in an enclosed area	APF 10	APF 10



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



Construction – Written Exposure Control Plan

- The plan must describe:
 - Tasks involving exposure to respirable crystalline silica
 - Engineering controls, work practices, and respiratory protection for each task
 - Housekeeping measures used to limit exposure
 - Procedures used to restrict access, when necessary to limit exposures



Construction – Competent Person

- Construction employers must designate a competent person to implement the written exposure control plan
- *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



Construction – Medical Surveillance

- Employers must offer medical examinations to workers:
 - Who will be **required to wear a respirator under the standard** for 30 or more days a year.
- Employers must offer examinations every three years to workers who continue to be exposed above the trigger
- Exam includes medical and work history, physical exam, chest X-ray, and pulmonary function test (TB test on initial exam only)



Construction – Compliance Dates

- Effective date is 90 days after publication in *Federal Register*
- Employers must comply with all requirements (except methods of sample analysis) one year after effective date
- Compliance with methods of sample analysis two years after effective date



Questions?

- Silica Rulemaking Web page:
www.osha.gov/silica
 - Fact sheets
 - FAQs
 - Video
- Appendix B – Medical Surveillance Guidelines

