

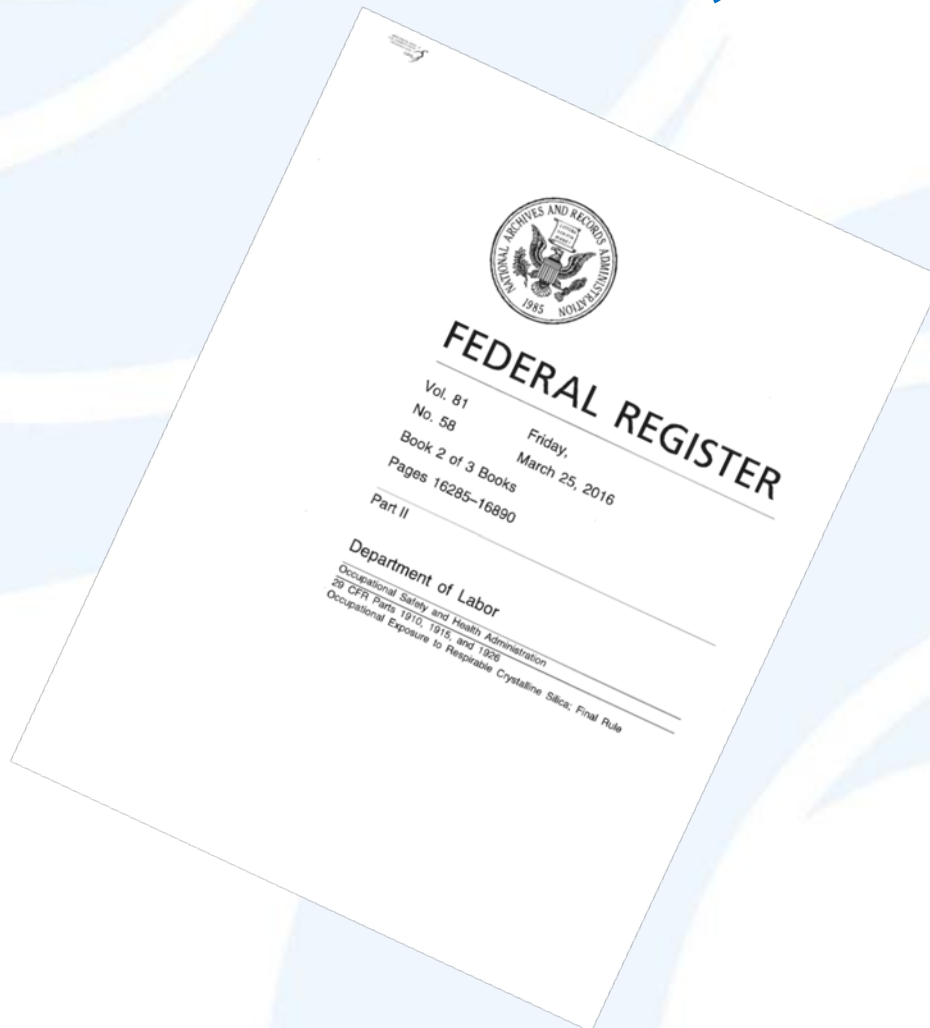
OSHA's Final Rule on Occupational Exposure to Respirable Crystalline Silica



Adam Henson, CSHO
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Final Rule Published on March 25, 2016





Reasons for the Rule

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



Most Important Reason for the Rule

- **Previous PELs do not adequately protect workers**
- Exposure to respirable crystalline silica has been linked to:
 - Silicosis
 - Lung cancer
 - Chronic obstructive pulmonary disease
 - Kidney disease
- Extensive epidemiologic evidence that lung cancer and silicosis occur at exposure levels below $100 \mu\text{g}/\text{m}^3$



Health Benefits

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

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



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



Respirable Crystalline Silica Rule

- Two standards:
 - One for general industry and maritime
 - One for construction
- Similar to other OSHA health standards and ASTM consensus standards



General Industry/Maritime Standard

- (a) Scope
- (b) Definitions
- (c) Permissible exposure limit (PEL)
- (d) Exposure assessment
- (e) Regulated areas
- (f) Methods of compliance
 - (1) Engineering and work practice controls
 - (2) Written exposure control plan
- (g) Respiratory protection
- (h) Housekeeping
- (i) Medical surveillance
- (j) Communication of silica hazards
- (k) Recordkeeping
- (l) 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 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 Level = $25 \mu\text{g}/\text{m}^3$ 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
- 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 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





General Industry/Maritime – Regulated Areas

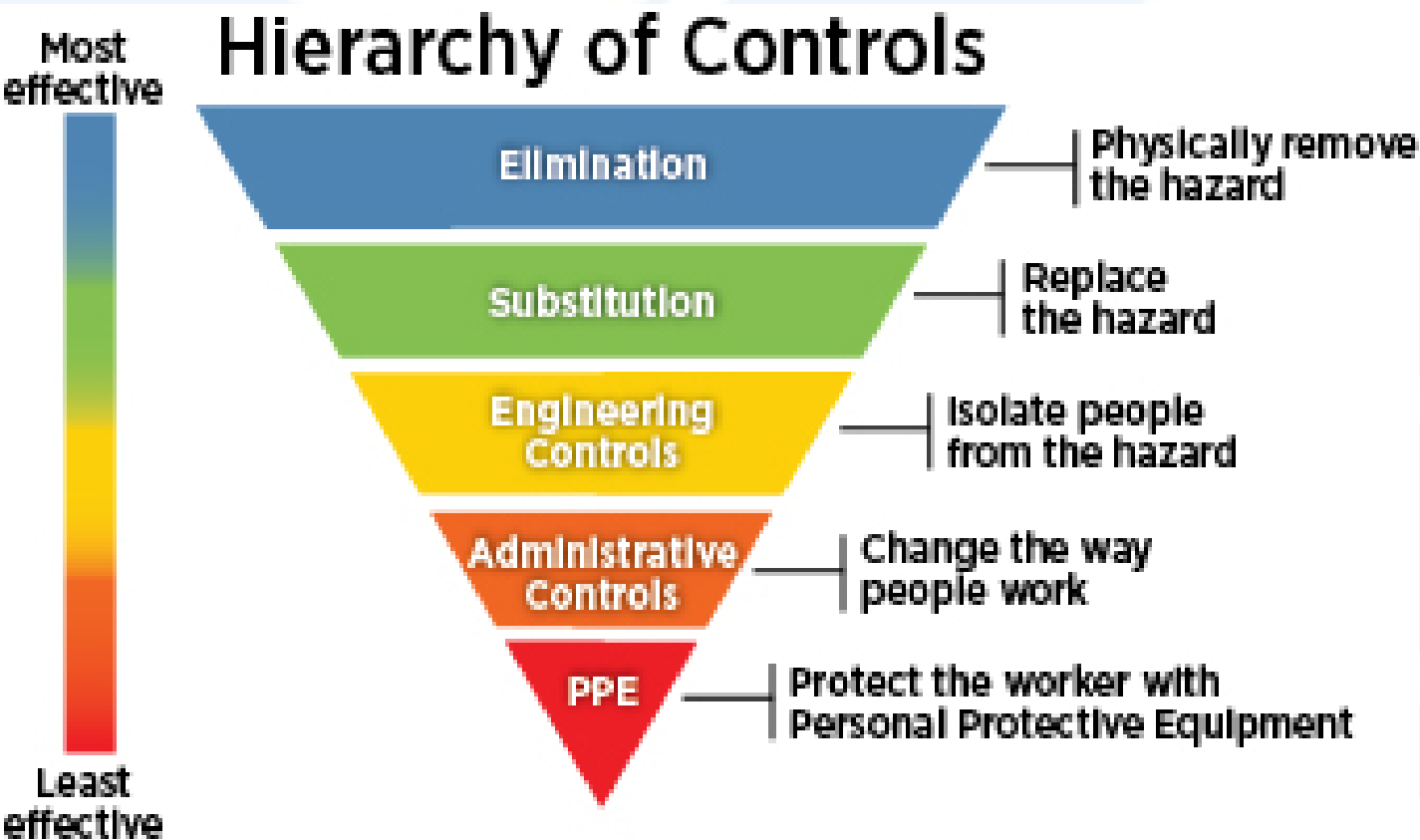
- Required where exposures can reasonably be expected to exceed the PEL
- Must be demarcated in any manner that limits workers in the area
- Must post warning signs at entrances
- Respirator use required



Methods of Compliance – Hierarchy of Controls

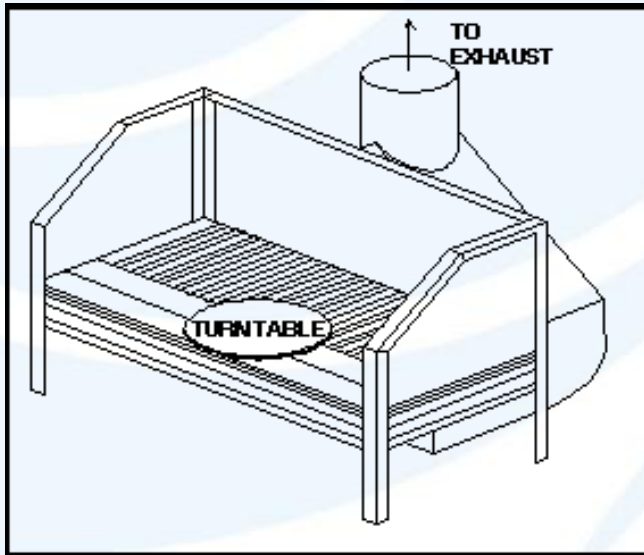
- Employers can use any engineering or work practice controls to limit exposures to the PEL
- Respirators permitted where PEL cannot be achieved with engineering and work practice controls

Hierarchy of Controls

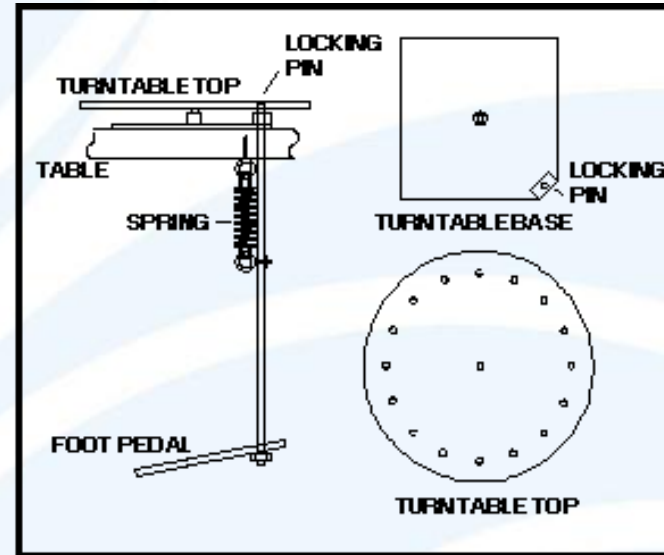


Source: NIOSH

Engineering Controls



Downdraft ventilated casting-cleaning workstation.



Casting-cleaning turntable.

Work Practice Controls

DANGER

**RESPIRABLE CRYSTALLINE
SILICA MAY CAUSE CANCER**

CAUSES DAMAGE TO LUNGS, WEAR RESPIRATORY
PROTECTION IN THIS AREA

AUTHORIZED PERSONNEL ONLY

Personal Protective Equipment





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, any work restrictions, and recommendations concerning any further evaluation or treatment
- 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

Employers must comply with all requirements of the standard by June 23, 2018, except:

- Employers must comply with the action level trigger for medical surveillance by June 23, 2020. (The PEL is the trigger from June 23, 2018 through June 23, 2020.)
- Hydraulic fracturing operations in the oil and gas industry must implement engineering controls to limit exposures to the new PEL by June 23, 2021.



Construction Standard

- (a) Scope
- (b) Definitions
- (c) Specified exposure control methods
- OR**
- (d) Alternative exposure control methods
 - (1) PEL
 - (2) Exposure Assessment
 - (3) Methods of Compliance
- (e) Respiratory protection
- (f) Housekeeping
- (g) Written exposure control plan
- (h) Medical surveillance
- (i) Communication of silica hazards
- (j) Recordkeeping
- (k) Dates



Guidance and Outreach (OSHA)

- Silica Webpage: www.osha.gov/silica
- Small Entity Compliance Guide
- Fact sheets
 - Overview of construction standard
 - Dust control methods for Table 1 equipment
- FAQs
- Video
- Appendix B – Medical Surveillance Guidelines

The image displays two OSHA documents. The top document is the 'Small Entity Compliance Guide for the Respirable Crystalline Silica Standard for General Industry and Maritime'. It features the OSHA logo and a blue header. Below the header is a photograph of a worker in a white protective suit and respirator, with the caption 'OSHA 3911-07 2017'. The bottom document is an 'OSHA Fact Sheet' titled 'OSHA's Respirable Crystalline Silica Standard for General Industry and Maritime'. It includes a 'CONTROL SILICA DUST' logo and a photograph of a worker in a workshop. The fact sheet contains detailed information about the standard, including definitions, exposure limits, and control measures.

OSHA Occupational Safety and Health Administration
www.osha.gov

Small Entity Compliance Guide
for the Respirable Crystalline Silica Standard for General Industry and Maritime

OSHA Fact Sheet

OSHA's Respirable Crystalline Silica Standard for General Industry and Maritime

Workers who are exposed to respirable crystalline silica dust are at increased risk of developing serious silica-related diseases. OSHA's standard requires employers to take steps to protect workers from exposure to respirable crystalline silica.

What Is Respirable Crystalline Silica?
Crystalline silica is a common mineral that is found in materials such as stone, artificial stone, and sand. When workers cut, grind, or drill materials that contain crystalline silica, or use industrial sand, they can be exposed to very small silica dust particles. These tiny particles (known as "respirable" particles) can travel deep into workers' lungs and cause silicosis, an incurable and sometimes deadly lung disease. Respirable crystalline silica also causes lung cancer, other potentially debilitating respiratory diseases such as chronic obstructive pulmonary disease, and kidney disease. In most cases, these diseases occur after years of exposure to respirable crystalline silica.

How Are Workers in General Industry and Maritime Exposed to Respirable Crystalline Silica?
Workers can be exposed to respirable crystalline silica during the:

- Manufacture of glass, pottery, ceramic, brick, concrete, asphalt roofing, jewelry, artificial stone, dental porcelain, or structural clay products;
- Use of industrial sand in operations such as foundry work and hydraulic fracturing; and
- Use of sand for abrasive blasting (e.g., maritime operations).

What Does the Standard Require?
The standard for general industry and maritime (29 CFR 1910.1053) requires employers to:

- Determine the amount of silica that workers are exposed to if it is, or may reasonably be expected to be, at or above the action level of 25 µg/m³ (micrograms of silica per cubic meter of air), averaged over an 8-hour day;
- Protect workers from respirable crystalline silica exposures above the permissible exposure limit (PEL) of 50 µg/m³, averaged over an 8-hour day;
- Limit access to areas where workers could be exposed above the PEL;
- Use dust controls and safer work methods to protect workers from silica exposures above the PEL;
- Provide respirators to workers when dust controls and safer work methods cannot limit exposures to the PEL;
- Establish and implement a written exposure control plan that identifies tasks that involve exposure and methods used to protect workers;
- Restrict housekeeping practices that expose workers to silica, such as use of compressed air without a ventilation system to capture the dust and dry sweeping, where effective, safe alternatives are available;
- Offer medical exams—including chest X-rays and lung function tests—every three years to workers exposed at or above the action level for 30 or more days per year;
- Train workers on the health effects of silica exposure, workplace tasks that can expose them to silica, and ways to limit exposure; and
- Keep records of workers' silica exposure and medical exams.

A worker uses a stone grinder at their apron, sector of the work surface to reduce silica dust levels in the air.

Guidance (AFS)

- Crystalline Silica Resource Page
 - www.afsinc.org/silica
 - Webinars
 - Signs
 - Timeline and Resource Links
 - OSHA Enforcement Documents
 - Vendors
 - Sampling
 - Detailed Information on the Rule
 - OSHA Resources
 - Silica Control Resources
 - Case Studies



Consultation Programs



Questions?

