PULLMAN

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

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Presentation key points

- What is silica
- What is the scope & coverage of this new rule
- Important dates for compliance
- Exposure limits (PELs)
- Compliance expectations
    - Monitoring
    - Engineering Controls
    - Medical Surveillance
    - Written Control Plans
    - Training Requirements
- Resources

What is Silica

- Crystalline silica is a common mineral that is found in natural materials such as sand, stone, and rock; it is also found in manmade materials such as concrete, brick, block, and mortar with the most common form of crystalline silica as quartz.

- Crystalline silica is a hazard in the workplace when silica-containing materials are handled in a manner that *releases respirable silica dust*.

  - Respirable silica particles are about 100 times smaller than grains of sand typically found on beaches or playgrounds.

  - Exposures to respirable silica dust occur when workers cut, grind, crush, or drill silica-containing materials such as concrete, masonry, tile, and rock, and in operations such as sandblasting.

Scope of Coverage

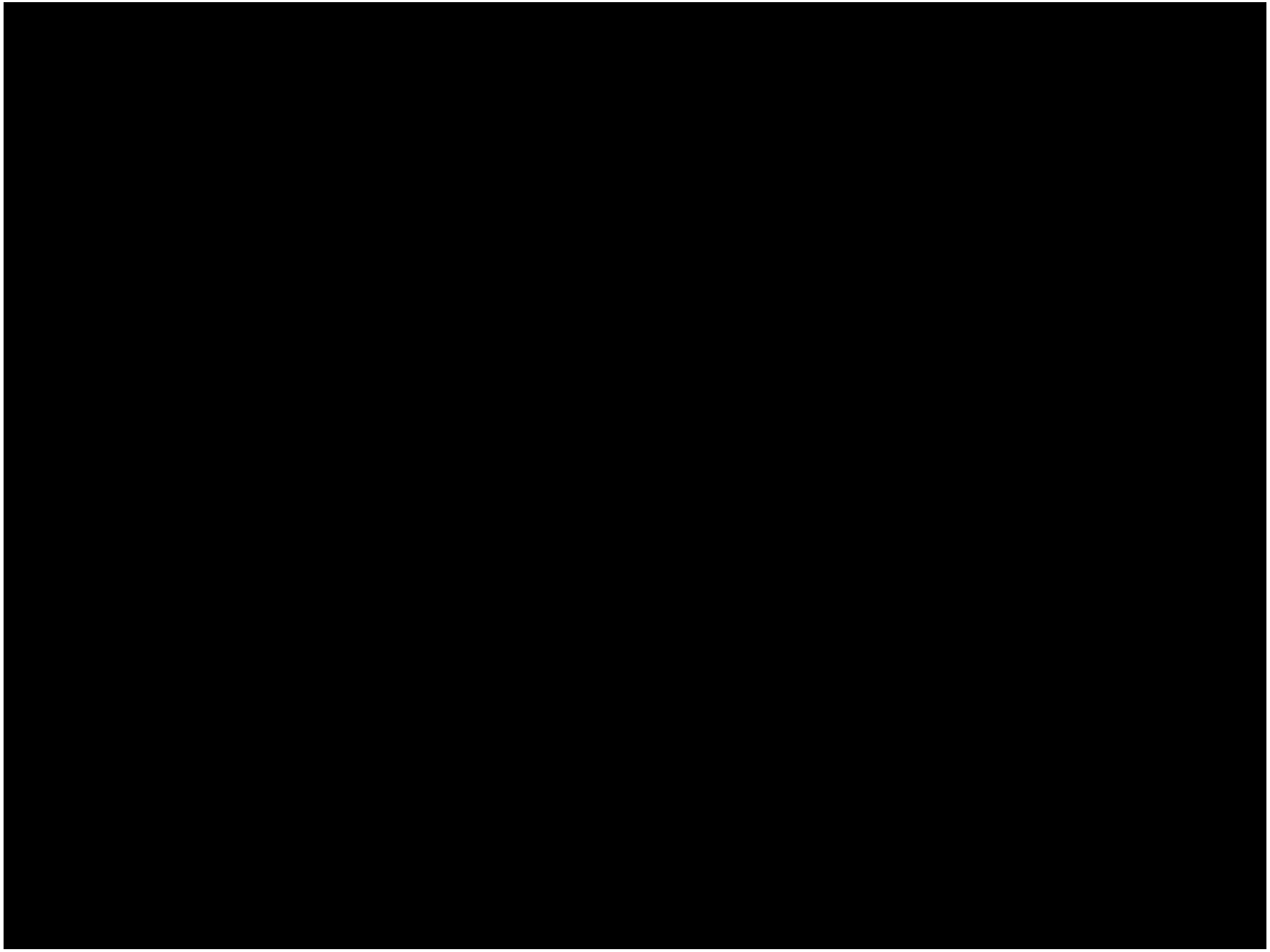
- Three forms of silica: quartz, cristobalite and tridymite
- Exposures from chipping, cutting, sawing, drilling, grinding, sanding, and crushing of concrete, brick, block, rock, and stone products (such as in construction operations)
- Exposures from using sand products (such as glass manufacturing,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



OSHA Stop Silicosis (2016)

Final Rule Published on March 25, 2016

- The proposed rule was posted on OSHA's website in August, 2013 and published in the Federal Register in September, 2013.
- OSHA received more than 2000 written comments during a nearly year-long public comment period.
- Over 200 stakeholders, representing over 70 organizations, including public health groups, trade associations, and labor unions, presented testimony during public hearings on the proposed rule.
- OSHA considered all of this information in developing the final rule.
- Two standards:
  - One for general industry and maritime
  - One for construction
- The rule was created similar to other OSHA health standards and ASTM consensus standards

Construction – Compliance Dates

- Employers must comply with all requirements (except methods of sample analysis) by June 23, 2017
  - Controls for most construction tools are readily available and can be quickly adopted.
  - Most construction employers are expected to use Table 1 and will not need to measure worker exposures to respirable crystalline silica.
- Compliance with methods of sample analysis required by June 23, 2018
  - Employers who measure employee exposures have until June 23, 2018, to use laboratories that follow the procedures for sample analysis in Appendix A of the standard.

Reasons for the Rule

- Previous permissible exposure limits (PELs) were formulas that many find hard to understand

$$\text{OSHA PEL} = \frac{10}{\%\ SiO_2 + 2} \quad \text{expressed in mg/m3}$$

- Construction/shipyard PELs are obsolete particle count limits

  - OSHA adopted permissible exposure limits for respirable crystalline silica in construction, general industry, and shipyards in 1971, shortly after the Agency was created.

  - Those PELs are outdated. The PELs for construction and shipyards are expressed in millions of particles per cubic foot, and are based on an obsolete sampling method that has not been used for many years.

Most Important Reason for the Rule

- Previous PELs do not adequately protect workers

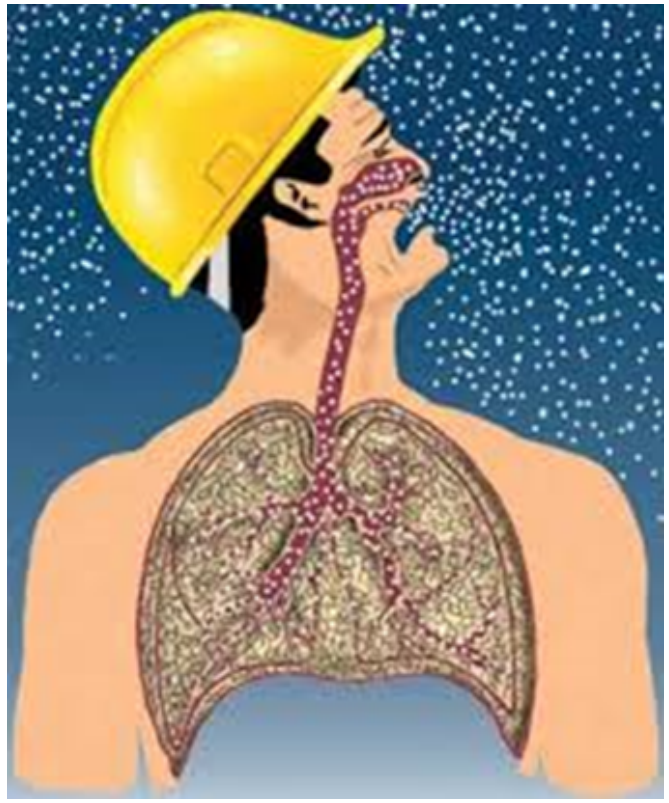
- Exposure to respirable crystalline silica has been linked to:
  - Silicosis
  - Lung cancer
  - Chronic obstructive pulmonary disease (COPD)
  - Kidney disease

- Extensive medical evidence that lung cancer and silicosis occur at exposure levels below 100 $\mu g/m^3$

Health Benefits

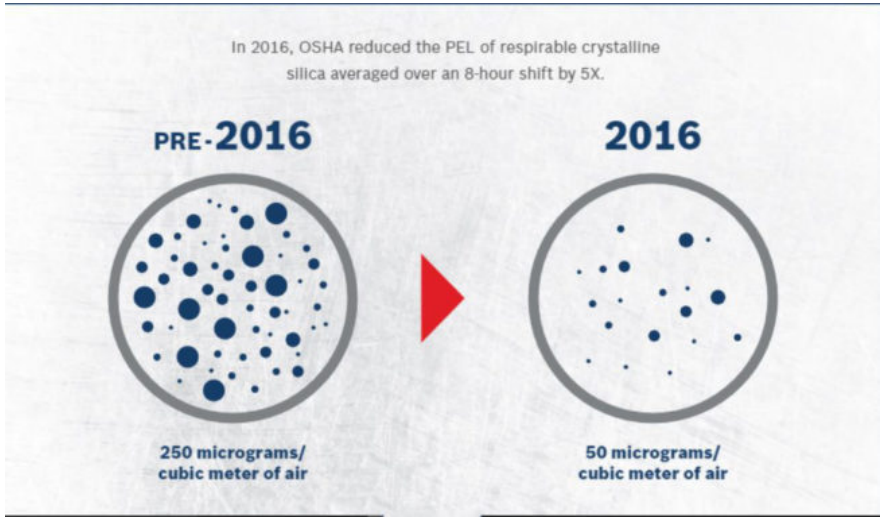
OSHA estimates that once the effects of the rule are fully realized, it will prevent:

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



Understanding PELs

- General industry formula PEL is about equal to 100 µg/m^3; whereas construction/shipyard formulas are about 250 µg/m^3



  - Anyone who uses modern sampling methods, including OSHA compliance staff, must apply a conversion factor to determine if sampling results are in compliance with the PEL.

  - The PELs are also inconsistent. The construction and shipyard PELs allow workers in those sectors to be exposed to silica levels over twice as high as workers in general industry.

EXPOSURE LIMITS	
Primary organization who sets OELs	
OSHA Occupational Safety and Health Administration	Permissible Exposure Limits (PEL) – The Law
ACGIH Defining the Science of Occupational and Environmental Health	Threshold Limit Values (TLV) – Volunteer (best practice)
National Institute for Occupational Safety and Health NIOSH	Recommended Exposure Limits (REL) - Volunteer

Permissible Exposure Limit (PEL)

- PEL = 50 µg/m^3 as an 8-hour TWA
  - (The new PEL significantly reduces, but does not eliminate, significant risk of developing silica-related disease).

- Action Level = 25 µg/m^3 as an 8-hour TWA
  - (The action level triggers requirements for exposure assessment and, medical surveillance).

Exposure Assessment:

- Required if exposures are or may reasonably be expected to be at or above action level of 25 µg/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

- The performance option provides flexibility for employers by allowing them to assess worker exposure based on any air monitoring data and/or objective data that is sufficient to accurately characterize worker exposure.

- For example, under this option an employer could determine that there is no meaningful difference between the exposure of an employee in a certain job classification who performs a task in a particular work area on one shift and the exposure of another employee in the same job classification who performs the same task in the same work area on a different shift. In that case, the employer could characterize the exposure of the second employee based on the characterization of the first employee's exposure.

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

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 Action Level: **no additional monitoring**
  - Most recent at or above the Action Level: **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 Action Level, **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

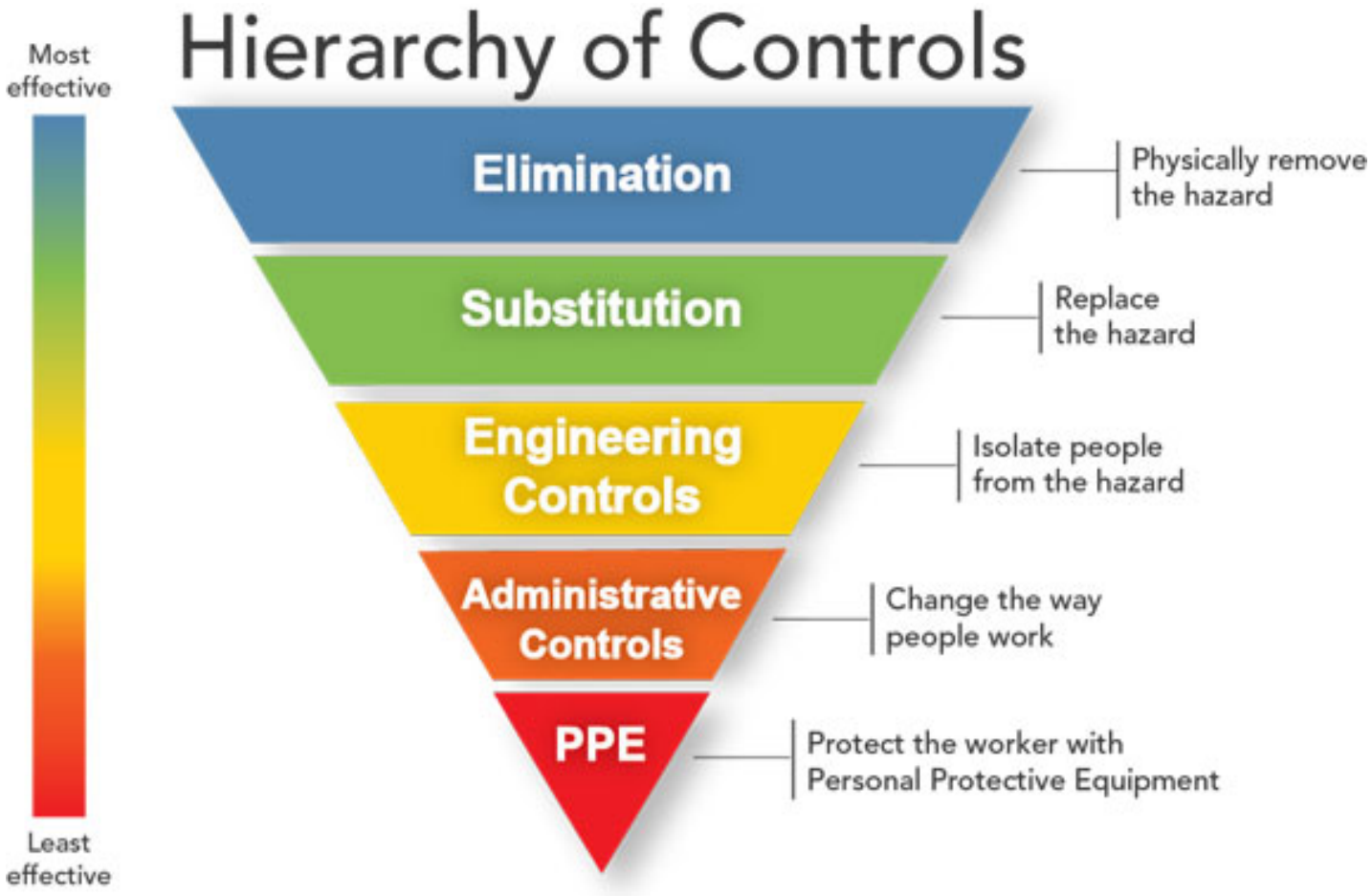
- Appendix A specifies methods of sample analysis

  - Allows for use of OSHA, NIOSH, or MSHA methods
  - Analysis must be conducted by accredited laboratories that follow specified quality control procedures

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

Engineering Controls (cont.)

Grinding without engineering controls

Grinding using a vacuum dust collector

Engineering Controls (cont.)

Jackhammer use without engineering controls

Jackhammer use with water spray to control dust

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

Assigned Respirator Protection Factors

= 10

Half Mask APR

= 1000

Full Face PAPR

: 50

Full Face APR

> 1000

Self Contained Breathing Apparatus

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

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

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

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
  - NOTE: The most common methods of limiting silica exposures in Table-1 are wet methods, where water is used to keep silica-containing dust from getting into the air, and vacuum dust collection systems, which capture dust at the point it is made.

Example of a 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	Use saw equipped with **integrated water delivery system** that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None

Example of a 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. Operate and maintain tool in accordance with manufacturers' instruction to minimize dust - When used outdoors - When used indoors or in an enclosed area	None APF 10	APF 10 APF 10

List of Table-1 Entries:

1. Stationary masonry saws
2. Handheld power saws
3. Handheld power saws for fiber cement board
4. Walk-behind saws
5. Drivable saws
6. Rig-mounted core saws or drills
7. Handheld and stand-mounted drills
8. Dowel drilling rigs for concrete
9. Vehicle-mounted drilling rigs for rock and concrete
10. Jackhammers and handheld powered chipping tools

11. Handheld grinders for mortar removal (tuck pointing)
12. Handheld grinders for other than mortar removal
13. Walk-behind milling machines and floor grinders
14. Small drivable milling machines
15. Large drivable milling machines
16. Crushing machines
17. Heavy equipment and utility vehicles to abrade or fracture silica materials
18. Heavy equipment and utility vehicles for grading and excavating

Fully and Properly Implementing Controls Specified on Table-1

- Two critical components of this approach are: fully and properly implementing controls; and identifying employees engaged in the task. 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 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 engaged in the task include the tool operator and other employees who are assisting with the task (for example, a worker helping the operator of a walk-behind saw by guiding the saw and making sure that the cutting is precise).

- Employees are not "engaged in the task" if they are only in the vicinity of a task. For employees not engaged in the task, access must be limited according to procedures described in the written exposure control plan (to be discussed later).

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 – Written Exposure Control Plan

- The Written Exposure Control Plan must also requires a description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to respirable crystalline silica and their level of exposure, including exposures generated by other contractors.
    - This provision is intended to limit exposures to employees who might otherwise work adjacent to tasks that involve high exposures to respirable crystalline silica dust.
    - Limiting access is necessary when workers are required to use respiratory protection for a task.
- Construction employers will not need to constantly update the plan for new locations, as long as the plan addresses the tasks, control measures, and procedures used to restrict access at the location.

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

Training Requirements

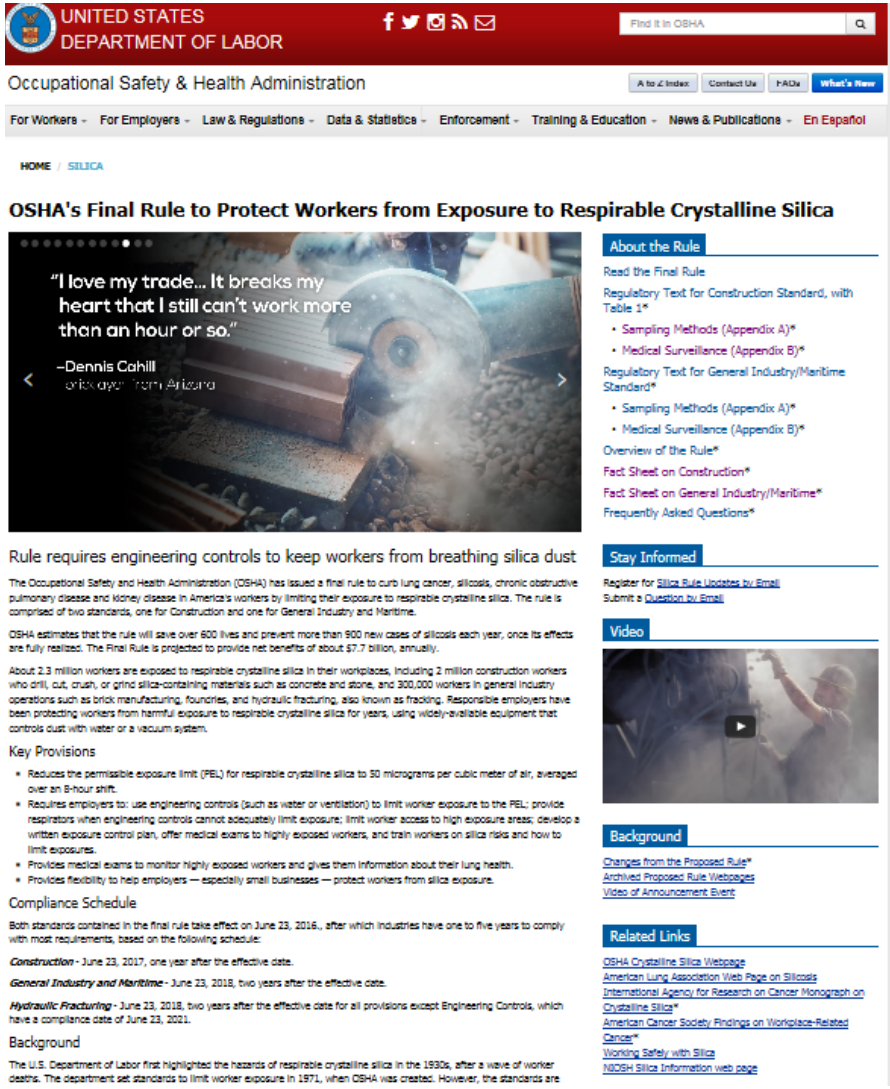
- Silica must be included in the employer's Hazard Communication Program (29 CFR 1910.1200)

- Training should include:

  - OSHA's silica standard
  - Health hazards of silica (lung, immune system and kidney effects)
  - Work tasks that could result in silica exposure
  - Control measures
  - Identity and role of the competent person
  - Medical surveillance requirements

Silica Resources

- https://www.osha.gov/silica/#1B - OSHA's Final Rule (Exposure to Respirable Crystalline Silica)
- www.silica-safe.org CPWR's Silica Safe site:
- https://www.osha.gov/dsg/topics/silicacrystalline - Crystalline Silica Safety & health topics
- http://monographs.iarc.fr/ENG/Monographs/vol100C/mono100C-14.pdf - Silica dust, crystalline in the form or quartz & cristobalite
  http://www.silica-safe.org/ - Create a silica exposure plan
- http://www.cdc.gov/niosh/topics/silica/ - NIOSH Silica
- https://www.osha.gov/silica/Silica_FAQs_2016-3-22.pdf - OSHA Silica FAQ's



Questions?