

# OSHA's Respirable Crystalline Silica Rule

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# Respirable Crystalline Silica Rule

- **Two standards:**
  - **General industry and Maritime**
    - **1910.1053**
  - **Construction**
    - **1926.1153**

# Compliance Dates

- Construction employers must comply by June 23, 2017
- General Industry employers must comply 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.

# Why the new Rule is better

- Construction/shipyard PELs are obsolete particle count limits
- Current permissible exposure limits (PELs) are formulas that many find hard to understand
- Difference between old GI formula PEL approximately  $100 \mu\text{g}/\text{m}^3$  compared to construction formula of  $250 \mu\text{g}/\text{m}^3$

# Exposure and Health Risks

Exposure to respirable crystalline silica has been linked to:

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

# Reasons for the new Rule

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

# 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
- Prevent more than 900 new cases of silicosis each year



# 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

# 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

# Scope of Coverage

- Three forms of silica:
  - quartz,
  - cristobalite
  - tridymite
  
- Exposures from chipping, cutting, sawing, drilling, grinding, sanding, and crushing concrete, brick, block, rock and stone

# 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

# Construction

(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

(k) Dates

# 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 may reasonably be expected to be at or above action level of  $25 \mu\text{g}/\text{m}^3$
- Exposures assessments must follow:
  - 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

- Prescribed schedule for initial and periodic personal monitoring
- If monitoring indicates:
  - Initial below the AL: no additional monitoring
  - Above the AL: repeat within 6 months
  - 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**

# Methods of Sample Analysis

- Employers must ensure that samples are analyzed by an accredited laboratory that follow specified quality control procedures
- Appendix A allows use of OSHA, NIOSH, or MSHA method for sampling and analysis

# 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

# 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 |
| <b>Handheld power saws (any blade diameter)</b> | <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 manufacturers' instruction to minimize dust</p> <ul style="list-style-type: none"> <li>- When used outdoors</li> <li>- When used indoors or in an enclosed area</li> </ul> | None                                            | APF 10       |
|                                                 |                                                                                                                                                                                                                                                                                                                                      | APF 10                                          | APF 10       |

# 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 |
| <b>Stationary masonry saws</b> | <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         |

# 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



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

# General Industry/Maritime - Written Exposure Control Plan

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

# 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

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

# Respiratory Protection

- Must comply with 29 CFR 1910.134
- Respirators required:
  - 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 and Maritime)

# Housekeeping

- When it contributes to exposure, employers must prohibit:
  - Dry sweeping or brushing
  - Use of compressed air for cleaning surfaces or clothing

**Employer should use ventilation, HEPA vacuums, and wet sweeping.**

# GI Medical Surveillance

- 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 occupationally exposed to respirable crystalline silica at or above the action level for 30 or more days per year
- within 30 days of initial assignment
- Employers must offer examinations every three years to workers who continue to be exposed above the trigger



# 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)

# Medical examination

- A medical and work history, with emphasis on:
  - Past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system;
  - History of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing);
  - History of tuberculosis;
  - Smoking status and history;
- A physical examination with special emphasis on the respiratory system;

# Medical examination continued:

- **A chest X-ray**
  - (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography systems), interpreted and classified according to the International Labour Office (ILO) International Classification of Radiographs of Pneumoconioses by a NIOSH-certified B Reader;
- **A pulmonary function test**
  - to include forced vital capacity (FVC) and forced expiratory volume in one second ( $FEV_1$ ) and  $FEV_1/FVC$  ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;
- **Testing for latent tuberculosis infection;** and
- Any other tests deemed appropriate by the PLHCP.

# Medical Opinion

- Worker receives report with medical findings
- Employer receives an opinion that 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

# Information provided to the PLHCP

- The employer shall ensure that the examining PLHCP has a copy of the standard,
- A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;
- The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;
- A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and
- Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the employer.

# PLHCP's report for the employee

- A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;
- Any recommended limitations on the employee's use of respirators;
- Any recommended limitations on the employee's exposure to respirable crystalline silica; and
- A statement that the employee should be examined by a specialist (pursuant to paragraph (i)(7) of this section) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

# PLHCP's written medical opinion for the employer

- shall be obtained within 30 days of the medical examination and contain:
- The date of the examination;
- A statement that the examination has met the requirements of this section; and
- Any recommended limitations on the employee's use of respirators.

# If the employee provides written authorization, the opinion may contain

- Any recommended limitations on the employee's exposure to respirable crystalline silica;
- A statement that the employee should be examined by a specialist (pursuant to paragraph (i)(7) of this section) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.
- the employer shall make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.



# Communication of Hazards

- Employers required to comply with hazard communication standard (1910.1200)
- Address at least the following hazards: Cancer, lung effects, immune system effects, and kidney effects as part of HCS
- Train workers on health hazards, tasks resulting in exposure, workplace protections, medical surveillance, and elements of the standard.

# Recordkeeping

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

Employer shall maintain an accurate record of all exposure measurements and include

- The date of measurement for each sample taken;
- The task monitored;
- Sampling and analytical methods used;
- Number, duration, and results of samples taken;
- Identity of the laboratory that performed the analysis;
- Type of personal protective equipment, such as respirators, worn by the employees monitored; and
- Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.