How the Silica Rules May Apply to You

A MIOSHA Perspective –
Overview of MIOSHA Part 590 and 690

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Objective
To provide an overview of MIOSHA Part 590, Silica in General Industry and MIOSHA Part 690, Silica in Construction.
Video - https://www.youtube.com/watch?v=HAByIlzQSuU

MIOSHA Silica Standards
- Address respirable crystalline silica exposures:
- Two standards in Michigan:
  - MIOSHA Part 590, Silica in General Industry.
  - MIOSHA Part 690, Silica in Construction.
  - Maritime industry is addressed by Federal OSHA.
- Adopts the Federal OSHA requirements by reference.

Respirable Crystalline Silica
Where can it be found:
- Concrete
- Masonry
- Sandstone
- Rock
- Paint
- Abrasives
- Mortar
- Plaster
- Shingles
- Soil

Definition: Respirable Crystalline Silica
Part 590, Rule 59015 (9) and Part 690, Rule 69015 (9)
- Silica is comprised of crystalline quartz, cristobalite, and/or tridymite.
- The respirable fraction (10 microns in diameter or less) is of greatest concern as these tiny, dagger-like particles have the potential to reach the delicate alveolar lung tissue.

Exposure and Health Risks
- OSHA estimates more than 840,000 employees in construction and more than 100,000 employees in general industry are exposed to workplace silica levels that exceed the revised permissible exposure limit (PEL).
- Exposure to respirable crystalline silica has been linked to:
  - Silicosis,
  - Lung cancer,
  - Chronic obstructive pulmonary disease (COPD), and
  - Kidney disease.

SYMPTOMS
- Difficulty in Breathing
- Cough
- Infections Causing
  - Fever
  - Weight Loss
  - Night Sweats

Silica Exposure Limits

Part 590, 1910.1053 (c) and Part 690, 1926.1153 (d)(1)

- PEL: permissible exposure limit 50 µg/m^3, 8-hr TWA
  - AL: action limit 25 µg/m^3, 8-hr TWA

Tasks/Activities At Risk of Exposure to Silica Not An All-Inclusive Listing

- Using tools and heavy equipment for demolition
- Chipping, cutting, sawing, drilling, grinding, sanding, and crushing of concrete, brick, block, rock, and stone products
- Use of sand products (blasting)
- Use of handheld power saws without dust controls to cut concrete

Part 590 (G.I.) - Scope & Application

- Part 590 Silica in General Industry
- Applies to all occupational exposures to respirable crystalline silica, except:
  - Construction work
  - Agricultural Operations
  - Processing sorptive clays (like kitty litter)

Part 590 General Industry DOES NOT apply if:

Employee exposure is maintained below 25 micrograms per cubic meter of air (25 µg/m^3) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

OR

1. The employer complies with Part 690 (construction rule) AND
2. The task performed is indistinguishable from a construction task listed on Table 1 in Part 690 Silica in Construction AND
3. The task will not be performed regularly in the same environment and conditions (non-routine tasks).

Exposure Assessment and Control

Part 690, Construction

- 29 CFR 1926.1153 (c): Table 1
  - Table 1
  - Means of exhaust, wet methods, and enclosed cabs/booths
  - Multiple Table 1 tasks performed during a work shift

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...OR...

- 29 CFR 1926.1153 (d):
  - Permissible exposure limit (PEL)
  - Exposure assessment
  - Methods of compliance

Specified Exposure Control Methods

Part 690, 1926.1153 (c)(1), Table 1 Equipment/Tasks

1. Stationary masonry saws
2. Handheld power saws
3. Handheld power saws for cutting 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 for concrete
9. Vehicle-mounted drilling rigs for rock and concrete
10. Jackhammers and handheld powered chipping tools 11.

11. Handheld grinders for mortar removal (i.e., tuckpointing)
12. Handheld grinders for uses 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 used to abrade or fracture silica-containing materials
18. Heavy equipment and utility vehicles for tasks such as grading and excavating

Table 1 – Respiratory Protection Information

- APF = Assigned Protections Factor
- The number represents the protection offered by the rated respirator as a multiple of the PEL
- Examples:
  - Respirator with an APF of 10 = approved for use when exposures up to 10x the permissible exposure level (up to 500 µg/m^3 or 0.5 mg/m^3)
  - Respirator with APF of 50 = approved for use when exposures up to 50x the permissible exposure level (up to 2500 µg/m^3 or 2.5 mg/m^3)TYPES OF RESPIRATORS
    - Half Mask Air Purifying - Respirator APF=10
    - Full Face Air Purifying Respirator APF= 50
    - Full Face Powered Air Purifying Respirator APF=50
      - Abrasive Blasting - Type CE Positive Pressure Blast Hood

APF= 25 - 2,000

Example of Part 690

- Table 1 Task/Activity Stationary Masonry Saw
- Handheld Power Saws (any blade diameter)
- Handheld Power Saws (any blade diameter)

Implementation of Table 1 Control Measures Part 690, 1926.1153 (c)(2)

- Tasks performed indoors or in enclosed areas
- Tasks performed using wet methods
- Measures implemented that include an enclosed cab or booth

Tasks Performed Indoors or in Enclosed Areas Part 690, 1926.1153 (c)(2)(i)

Provide a means of exhaust as needed to minimize the accumulation of visible airborne dust.

Tasks Performed Using Wet Methods Part 690, 1926.1153 (c)(2)(ii)

Apply water at flow rates sufficient to minimize release of visible dust.

Performing > One Table 1 Task During a Shift

Part 690, 1926.1153 (c)(3)

- Where an employee performs more than one task on Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift.
- If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

Exposure Assessment – Construction and G.I.

Part 690, 1926.1153 (d) and Part 590, 1910.1053 (d)

The employer shall assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level in accordance with either the performance option or the scheduled monitoring option of the sections.

Performance Option – Construction and G.I.

Part 690, 1926.1153 (d) and Part 590, 1910.1053 (d)

The employer shall assess the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.

Objective Data – Definition Construction and G.I. Part 690, Rule 69015 (7) and Part 590, Rule 59015 (7)

- Information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee exposure to respirable crystalline silica associated with a particular product or material or a specific process, task, or activity.
- The data must reflect workplace conditions closely resembling (or with a higher exposure potential), types of material, control methods, work practices, and environmental conditions in the employer's current operations.

Objective Data Example

- Jobsite A: Exposure monitoring reveals employee exposures = 20 mg/m^3; use of portable handsaw to cut the concrete floor in a 40' × 40' × 10', vented room; wet methods and HEPA vacuums are used; the concrete is 15% crystalline quartz.
- Jobsite B: No exposure monitoring has been performed; the employer wishes to use data from Jobsite A. The work at this site involves use of a portable handsaw to cut the concrete floor in a 20' × 20' × 8', unvented room; wet methods and HEPA vacuums are used; the concrete is 25% crystalline quartz.
- Can the employer use the data obtained at Jobsite A to represent employee exposures at Jobsite B?

Scheduled Monitoring Option

Part 690, 1926.1153 (d) and Part 590, 1910.1053 (d)

- Initial monitoring to assess the 8-hour TWA exposure to be representative of:
  - Each shift
  - Job classification
  - Work area.
- In representative sampling = employees with highest exposure to respirable crystalline silica.

Reassessment of Exposures

Part 690, 1926.1153 (d) and Part 590, 1910.1053 (d)

- Reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level,

OR

- When the employer has any reason to believe that new or additional exposures at or above the action level have occurred.

Employee Notification of Assessment Results

Part 690, 1926.1153 (d) and Part 590, 1910.1053 (d)

Within 5 (for Construction) or 15 (for General Industry) working days after completing an exposure assessment:

- Employer shall individually notify each affected employee in writing of the results.
- Employer can post results in appropriate location accessible to all affected employees. If exposures exceed the PEL, the employer shall describe in writing the corrective action being taken to reduce exposures.

Observation of Monitoring

Part 690, 1926.1153 (d) and Part 590, 1910.1053 (d)

- Affected employees or their designated representatives have the option to observe the air monitoring.
- Observers must comply with the PPE requirements of the area. Offered at no cost to the observer.

Regulated Areas – G.I. only

- Establishment – Shall establish a regulated area wherever an employee's exposure to

respirable crystalline silica is, or can reasonably be expected to be, above the PEL.
- Demarcation – Shall demarcate areas from the rest of the workplace in a manner that minimizes the number of employees exposed to silica within the regulated area.
- Access – Shall limit access to regulated areas to:
  - Persons authorized and required by work duties to be present.
  - Designated representatives exercising the right to observe monitoring.
  - MIOSHA/OSHA Officials

Signs for Regulated Area – G.I. only
The employer shall post signs at all entrances to regulated areas that bear the following legend:

AIR SAMPLING EQUIPMENT
- Personal Air Pump with Cyclone
- Frequency of Monitoring
  - Initial results < AL – no additional monitoring
  - Most recent result ≥ AL - Repeat again within 6 months
  - Most recent result > PEL - Repeat again within 3 months
  - Two consecutive non-initial, results, taken 7 or more days apart but less than 6 months < AL – Can discontinue monitoring

Sanding Overexposure - Example
- Drywall Hanger – during typical joint compound / drywall sanding. Pole sander used connected to shop vacuum (designed for lead remediation).
- Results for Silica =

530 µg/m^3 or 0.53 mg/m^3 TWA

That was more than 10X the PEL using recommended controls!
Note: Control was not used properly (not using perforated sanding screen)

Joint Compound Safety Data Sheet (SDS) Section 3
Note: Crystalline silica not listed in Section 3 as an "ingredient"
Joint Compound SDS Section 11 Joint Compound Label
Methods of Compliance
Part 690, 1926.1153 (d); (g) and Part 590, 1910.1053 (f)
- Engineering and work practice controls
- Abrasive blasting
- Written exposure control plan

Engineering and Work Practice Controls
Part 690, 1926.1153 (d) and Part 590, 1910.1053 (f)
- Employers shall use engineering and work practice controls to limit exposures to or below the PEL unless they are demonstrated to be not feasible.
- Use such controls even if they do not reduce exposures to or below the PEL; use to achieve lowest feasible level.
- Respirators used where PEL cannot be achieved with engineering and work practice controls

G.I. Engineering Control

Grinding/Polishing Stone
Construction Engineering Control Example Grinding
Written Exposure Control Plan
- Part 690, 1926.1153 (g) and Part 590, 1910.1053 (f)
- The employer shall establish and implement a written exposure control plan that contains at least the following elements:
- Description of:
  - Tasks with respirable silica exposure
  - Controls (engineering, work practice, respiratory protection)
  - Housekeeping measures
  - Procedures use to restrict access to work areas (construction only).

- Review the plan annually; update as necessary.
- Make the plan readily available.

Abrasive Blasting

Part 690, 1926.1153 (d) and Part 590, 1910.1053 (f)

The employer shall comply with other OSHA standards, when applicable, where abrasive blasting is conducted using crystalline silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.

- **Respiratory Protection**

Part 690, 1926.1153 (e) and Part 590, 1910.1053 (g)

- Must comply with MIOSHA Part 451.
- If exposures exceed the PEL, respirators are required:
  - For tasks where controls and/or work practices are not feasible.
  - While installing or implementing feasible controls and/or work practices.
  - When implemented feasible controls measures and/or work practices do not reduce exposures below the PEL.
  - As required by Table 1.
  - While in a Regulated Area (G.I. only)

- **Medical Surveillance**

Part 690, 1926.1153 (h) and Part 590, 1910.1053 (i)

- Baseline within 30 days after initial assignment:

Employers must make available medical examinations to workers:

- Construction: required to wear a respirator for 30 or more days a year.
- G.I.: exposed > Action Level for 30 or more days a year

FREQUENCY and CONTENT:

- Employers must offer examinations every three years
- Exam includes:
  - medical and work history,
  - physical exam,
  - chest X-ray, and pulmonary function test,
  - TB test (on initial exam only), and
  - any other test deemed appropriate by the PLHCP.
- 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 Silica Hazards – HAZCOM

Part 690, 1926.1153 (i) and Part 590, 1910.1053 (j)

HAZARD COMMUNICATION

- Include respirable crystalline silica
- Access to labels on containers of crystalline silica and safety data sheets, and is trained in accordance with the provisions of HCS and Part 690 or Part 590.
- Ensure that at least the following hazards are addressed: cancer, lung effects, immune system effects, and kidney effects.

Communication of Silica Hazards – Info/Train

Part 690, 1926.1153 (i) and Part 590, 1910.1053 (j)

Each employee shall demonstrate knowledge and understanding of:

- Health hazards associated with exposure to respirable crystalline silica;
- Specific tasks in the workplace that could result in exposure to respirable crystalline silica;
- Specific measures the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
- Contents of MIOSHA Part 690 or Part 590;

- Identity of the competent person designated by the employer
- Purpose and a description of the medical surveillance program.

Recordkeeping

Part 690, 1926.1153 (j) and Part 590, 1910.1053 (k)

- Make and maintain accurate records:
  - Air monitoring data,
  - Objective data, AND
  - Medical records.
- Content of records specified by the standard.
- Exposure records keep for 30 years per Part 470 – Medical Records and Trade Secrets

Effective Dates

- June 23, 2017 - Construction
- June 23, 2018 – General Industry All obligations except:
  - June 23, 2018 – Medical Surveillance (for employees > PEL for 30 or more days per year).
  - June 23, 2020 – Medical Surveillance (for employees ≥ Action Level for 30 days or more per year).
  - June 23, 2021 – Engineering Controls.
- June 23, 2021 - Hydraulic fracturing in oil/gas industry.

Resources

- Silica Small Entity Compliance Guides:
  - Construction: www.osha.gov/Publications/OSHA3902.pdf
  - General Industry: https://www.osha.gov/Publications/OSHA3911.pdf
- OSHA's Crystalline Silica Rule Fact Sheets:
  - Fact Sheet on General Industry/Maritime
  - Fact Sheet on Construction
- NIOSH Silica Information Webpage www.cdc.gov/niosh/topics/silica

Summary

Provided an overview of the contents of

- MIOSHA Part 690, Silica in Construction and
- MIOSHA Part 590 Silica in General Industry.