

Respirable Silica Exposure Control Program

Introduction

Crystalline silica is a common mineral that is found in construction materials such as sand, stone, concrete, brick, and mortar. Quartz is its most common form. All work involving chipping, cutting, drilling, grinding, or similar activities of materials containing crystalline silica can lead to the release of respirable-sized particles.

Breathing in very small ("respirable") crystalline silica particles, causes multiple diseases, including silicosis, an incurable lung disease that leads to disability and death. Respirable crystalline silica also causes lung cancer, chronic obstructive pulmonary disease (COPD), and kidney disease. Exposure to respirable crystalline silica is related to the development of autoimmune disorders and cardiovascular impairment. These occupational diseases are life-altering and debilitating disorders. Additional information is available for review in the [Silica Q&A](#).

This program is guided by the requirements of both the OSHA General Industry (29 CFR 1910.1053) and Construction (29 CFR 1926.1153) Standards as university employees may be involved in activities that are covered under either Standard.

Purpose

The purpose of this program is to prevent and/or reduce employee exposure to hazardous levels of respirable crystalline silica that could result from work activities.

Governing Regulations

[29 CFR 1910.1053 - Respirable crystalline silica](#)

[29 CFR 1926.1153 - Respirable crystalline silica](#)

Definitions

Action Level means a concentration of airborne respirable crystalline silica of $25 \mu\text{g}/\text{m}^3$, calculated as an 8-hour time-weighted average (TWA).

Competent Person means an individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has the authorization to take prompt corrective measures to eliminate or minimize them.

Employee Exposure means the exposure to airborne respirable crystalline silica that would occur if the employee were not using a respirator.

High-Efficiency Particulate Air (HEPA) Filter means a filter that is at least 99.97 percent efficient in removing monodispersed particles of 0.3 micrometers in diameter.

Objective Data means 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 than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

Permissible Exposure Limit (PEL) means the employer must ensure that no employee is exposed to an airborne concentration of respirable crystalline silica in excess of $50 \mu\text{g}/\text{m}^3$, calculated as an 8-hour TWA.

Physician or Other Licensed Health Care Professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by the medical surveillance section of the OSHA respirable crystalline silica standard.

Regulated Area means an area, demarcated by the employer, where an employee's exposure to airborne concentrations of respirable crystalline silica exceeds, or can reasonably be expected to exceed, the PEL.

Respirable Crystalline Silica means Quartz, Cristobalite, and/or Tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle size selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality-Particle Size Fraction Definitions for Health-Related Sampling.

Roles and Responsibilities

Environmental Health & Safety (EHS)

- Assists departments with job site and hazard assessments for silica containing materials, as needed.
 - Hazard assessments will determine if an employee's exposure to respirable crystalline silica will be above or below 25 $\mu\text{g}/\text{m}^3$ as an 8-hour TWA under any foreseeable conditions.
- Ensures that employees are educated in the hazards of silica and trained in safe work practices.
- Where necessary, conducts quantitative and qualitative assessments of employee exposure to respirable crystalline silica.
- Makes engineering, administrative, and personal protective equipment recommendations based on activity and sampling results.
- Recommends and requires corrective measures to eliminate or reduce the employee exposure to respirable crystalline silica.

Departments

- Identifies a competent person to implement this respirable crystalline silica exposure control program. The duties of the competent person are as follows:
 - Performs routine inspections of job/project sites, materials, and equipment to implement the exposure control plan.
 - Identifies existing and foreseeable respirable crystalline silica hazards in the workplace and takes prompt corrective measures to eliminate or minimize them.
- Ensures that work is conducted in a manner that minimizes and adequately controls the risk to employees and others. Enforces personal protective equipment (PPE) and work practice requirements.
- Informs EHS when processes, equipment, or other variables have changed that may affect exposure to respirable crystalline silica.
- Develops procedures for restricting access from other employees and the public, to work environments where production of silica dust is probable based on work tasks performed.

Employee

- Follows recognized work procedures (such as the construction tasks identified in OSHA's construction standard - [Table 1](#)) as established in the project's exposure control plan.
- Uses assigned PPE in an effective and safe manner.
- Reports any unsafe conditions or acts to a supervisor and/or competent person and EHS.
- Reports any exposure incidents or any signs or symptoms of silica illness to a supervisor and/or competent person and EHS.
- Restricts access to the work area where silica dust is produced in order to minimize the number of persons exposed to respirable crystalline silica dust.

External Contractors Completing Work at FSU Properties

- Contractors who are completing work that creates respirable crystalline silica dust must include a [Silica Exposure Control Plan](#) as part of their site-specific plan.

Requirements

Respirable crystalline silica requirements for general industry and construction tasks differ in their requirements. Both contain the following elements:

- Exposure assessment
 - Initial monitoring – performance or scheduled monitoring
- [Silica Exposure Control Plan](#)
- Housekeeping
- Respiratory protection
- Training
- Medical surveillance

Exposure Limits

Both the respirable crystalline silica general industry and the construction standards establish an action level (AL) and a permissible exposure limit (PEL) to reduce employee exposures to airborne concentrations of respirable silica.

- The AL is 25 $\mu\text{g}/\text{m}^3$ (micrograms per cubic meter) of silica in air.
- The PEL is 50 $\mu\text{g}/\text{m}^3$. No employee can be exposed to an airborne concentration of respirable crystalline silica in excess of 50 $\mu\text{g}/\text{m}^3$, calculated as an 8-hour TWA.
- Both the AL and the PEL are 8-hour TWAs.

Air Monitoring for General Industry and Construction

- Employers in general industry are required to conduct initial air monitoring to determine employee exposures for comparison to the AL and PEL.
- Employers in construction have options depending on the activity as discussed in the Construction Standard [Table 1](#). An employer that fully implements an equipment-control option in [Table 1](#) for a task will not have to perform air monitoring for that task.

- Employers in general industry whose employees are using these same types of equipment and performing these same types of tasks may also use the exposure control methods found in the construction standard as an alternative to exposure monitoring.
- Alternative exposure control methods - for tasks not listed in [Table 1](#), or where the employer does not fully and properly implement the engineering controls, work practices, and respiratory protection described in [Table 1](#), monitoring may be conducted in accordance with either the performance option or the scheduled monitoring option.
- Directors, supervisors, and lab managers must notify EHS of tasks with silica exposure so that monitoring can be coordinated.

Performance Option (alternative exposure control)

The 8-hour TWA exposure for each employee will be assessed based on any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.

Scheduled Monitoring Option (alternative exposure control)

Under the Scheduled Monitoring Option, requirements for periodic monitoring depends on the results of the initial and subsequent monitoring.

Initial monitoring will be performed to assess the 8-hour TWA exposure for each employee or a representative group performing the same tasks on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, and in each work area.

When using representative monitoring, the employee(s) who are expected to have the highest exposure to respirable crystalline silica will be monitored.

The following table shows periodic monitoring requirements following initial monitoring:

If Results of Initial Monitoring	Periodic Monitoring Requirement
Employee exposure < 25 µg/m ³ TWA	Monitoring will be discontinued
Employee exposure > the 25 µg/m ³ , and < the 50 µg/m ³ TWA	Repeat monitoring within 6 months of the most recent monitoring
Employee exposure is > 50 µg/m ³ TWA	Repeat monitoring within 3 months of the most recent monitoring

Results Reporting

After completing an exposure assessment, EHS will submit a report to the departmental supervisor. The department is responsible for ensuring each individual receives the results of that assessment. The results may also be posted in an appropriate location accessible to all affected employees.

Monitoring Results Above the PEL

Whenever an exposure assessment indicates that employee exposure is above the PEL, EHS will describe in the written notification the corrective action to reduce employee exposure to or below the PEL.

Corrective actions will be based on the monitoring data and the hierarchy of controls. Engineering and work practice controls will be used to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless it can be demonstrated that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to

or below the PEL, employee exposure will be reduced to the lowest feasible level and the use of respiratory protection must be required and used.

Reassessing Exposure Levels

Respirable crystalline silica exposure levels will be reassessed 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 there is any reason to believe that new or additional exposures at or above the action level have occurred.

EHS will ensure that all respirable crystalline silica samples taken to satisfy the monitoring requirements of this program and OSHA are collected by a qualified individual and the samples are evaluated by an accredited laboratory.

Exposure Control Plan

When employee exposure is expected to be at or above the action level, a written [Exposure Control Plan](#) (ECP) will be established and implemented.

The general industry and construction standards both require the development of a written ECP containing the following:

- A description of the tasks in the workplace that involve exposure to respirable crystalline silica.
- A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task.
- A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica.
- 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 employers or sole proprietors.

The written ECP will be reviewed at least annually to evaluate the effectiveness of it and update it as necessary. ECPs are project specific and most project durations do not exceed a year. The written ECP will be readily available for examination and copying, upon request, to each employee covered by this program and/or ECP.

Housekeeping

Where such activities could contribute to expose employees to silica, the following specific housekeeping requirements shall be implemented:

- Dry sweeping or dry brushing is prohibited. Wet sweeping and/or HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure must be used.
- Compressed air is prohibited and cannot be used to clean clothing or surfaces.

Respiratory Protection Program

If silica dust cannot be controlled and employees are required to use a respirator, employees must be enrolled in the [Respiratory Protection Program](#) before work commences.

Training and Information

Supervisors and departments will be responsible for site-specific training for respirable crystalline silica.

The following information will be incorporated into the EHS Hazard Communication Training:

- Health hazards of exposure to respirable crystalline silica
- Specific tasks that could result in exposure
- Specific measures the employer utilizes to control exposures including engineering controls, work practice controls, and respirators
- An explanation of the OSHA standard
- The purpose and description of the medical surveillance program

Medical Surveillance

Medical Surveillance is required for employees who will be required by the silica standard to wear a respirator for 30 or more days per year in the upcoming year (the next 365 days).

Summary of Medical Surveillance Requirements

Surveillance requirements, including an initial (baseline) medical examination within 30 days after initial assignment, include:

- A medical and work history
- A physical examination and chest x-ray
- A pulmonary function test
- Testing for latent tuberculosis infection
- Any other tests recommended by the physician

Periodic examinations must be provided every 3 years or more often if recommended by the physician. The [OSHA Silica Medical Surveillance Program Questionnaire Information](#) will be used by the physician to complete the examination.

The employer must ensure that the physician has a copy of the Silica standard and provide specific information including:

- A description of the employee's former, current, and anticipated duties as they relate to the employee's 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
- Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the employer