

Silica Exposure Control Plan

Introduction

Yale University's written Crystalline Silica Exposure Control Plan is designed to prevent health effects from respirable crystalline silica exposures. This plan follows the requirements of both the OSHA General Industry Rule (29 CFR 1910.1053) and the OSHA Construction Rule (29 CFR 1926.1153) as University employees may be involved in activities that are covered under either rule relative to potential crystalline silica exposures.

The requirements in this plan apply to all Yale University employees who are exposed to respirable crystalline silica at or above the action level or permissible exposure limit or perform construction-related tasks which are identified in Table 1 of the standard, as determined by Environmental Health and Safety.

Responsibilities

Various Yale University departments and employees have responsibilities under this plan:

Environmental Health and Safety (EHS)

- Providing program oversight and consultation to Yale University employees regarding potential risks, exposure prevention, and training relating to potential crystalline silica dust exposures.
- Implementing a suitable respirable crystalline silica exposure monitoring program, or otherwise ensuring representative exposure monitoring results are available.
- Designating a "competent person" and defining/assigning appropriate responsibilities.
- Ensuring project and/or task specific Exposure Control Plans (ECPs) are developed, communicated, and effectively implemented as appropriate.
- Ensuring that all affected employees and their managers or supervisors receive the necessary training related to this plan, as well as task specific ECPs.
- Maintaining applicable records, i.e. exposure sampling, respirator fit tests, training, etc. in accordance OSHA regulations.
- Notifying the Employee Health Office of any employee/job category that meets any of the criteria for inclusion in this plan.
- Conducting a review of this plan annually and updating it as necessary.

Employee Health Office

- Conducting medical surveillance in accordance with 1910.1053 and 1926.1153.
- Maintaining records of the physical examinations, x-rays and tests.
- Providing the Employee and Employer (Yale EHS) with the PHLCP's Written Medical Opinion, as required under the standard.

Supervisors

- Acting as the “Competent Person” as appropriate, including:
 - Inspecting job sites, materials and equipment on a regular and frequent basis;
 - Identifying existing and foreseeable respirable crystalline silica hazards and taking prompt corrective action to minimize or eliminate these hazards;
 - Being familiar with the Silica Exposure Control Plan;
 - Notifying EHS when problems arise, there is a change in engineering controls and work practices, or in situations of uncontrolled releases of visible dust in occupied buildings.
- Providing affected new employees with informal on-the-job training about this plan.
- Notifying the Environmental Health and Safety and Employee Health Offices about workplace conditions and potentially affected employees.
- Making information and training materials available to potentially affected employees.
- Supplying appropriate equipment and personal protective equipment (PPE) to affected employees free-of-charge.
- Requiring affected employees to wear personal protective equipment as outlined in the plan.
- Ensuring that affected employees receive medical surveillance and attend required training.

Affected Employees

- Observing the procedures and requirements outlined in this plan.
- Attending training sessions.
- Complying with medical surveillance requirements.
- Wearing respiratory protection, and other PPE, as required.
- Notifying supervisors of changes in the workplace that could cause an increase in exposures to respirable crystalline silica.

Requirements

Specified Exposure Control Methods

The University’s Facilities Operations staff are responsible for maintaining and renovating buildings. Potential silica-containing substrates and materials encountered include brick, cement, concrete, concrete block, drywall, grout, mortar, paints containing silica, plasters, roof tile, and various types of tile. Activities impacting these materials also vary, including cutting/sawing, demolishing/disturbing, drilling/coring, grinding, jackhammering, milling, mixing/pouring, sanding, scraping, and even clean-up activities such as sweeping and vacuuming.

OSHA has published a list of typical equipment and tasks, and necessary engineering controls and respiratory protection (Table 1 of the standard). Exposure monitoring is not required when following the provisions of Table 1. The table below identifies the tasks which are identified in the Respirable Crystalline Silica Standard’s Table 1 that Yale Facilities Operations staff perform.

The table also includes the methods of control applicable to that tool/task that Yale staff will follow to ensure their respirable crystalline silica exposures are minimized.

Integrated water delivery systems and shrouded power equipment with HEPA exhaust are the primary methods of control for all activities that disturb silica-containing materials. The equipment/tasks identified in the Standard’s Table 1 that are likely to be performed by Facilities Operations staff include:

Equipment/Task	Engineering & Work Practice Control Methods	Required Respiratory Protection & Minimum Assigned Protection Factor (APF)		
		≤4 hours/shift	≥4 hours/shift	
Stationary Masonry Saws	<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	
Handheld power saws (any blade diameter)	<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>			
		When used outdoors	None	APF 10
		When used indoors or in an enclosed area	APF 10	APF 10
Handheld power saws for cutting fiber-cement board (with blade diameter of 8” or less)	<p>For tasks performed outdoors only: Use saw equipped with commercially available dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.</p> <p>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.</p>	None	None	

Equipment/Task	Engineering & Work Practice Control Methods	Required Respiratory Protection & Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	≥4 hours/shift
Handheld and stand-mounted drills (including impact and rotary hammer drills)	<p>Use drill equipped with commercially available shroud or cowling with dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.</p> <p>Use a HEPA-filtered vacuum when cleaning holes.</p>	None	None
Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.		
	When use outdoors	None	APF 10
	When used indoors or in an enclosed area	APF 10	APF 10
	<p>OR</p> <p>Use tool equipped with a commercially available shroud and dust collections system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.</p>		
	When used outdoors	None	APF 10
	When used indoors or in an enclosed area	APF 10	APF 10

Equipment/Task	Engineering & Work Practice Control Methods	Required Respiratory Protection & Minimum Assigned Protection Factor (APF)	
		≤4 hours/shift	≥4 hours/shift
Handheld grinders for mortar removal (i.e., tuckpointing)	<p>Use grinder equipped with commercially available shroud and dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide 25cfm or greater of airflow per incho of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.</p>	APF 10	APF 10
Handheld grinders for uses other than mortar removal	<p>For tasks performed outdoors only:</p> <p>Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p>	None	None
	<p>OR</p> <p>Use grinder equipped with commercially available shroud and dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide 25cfm or greater of airflow per incho of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.</p>		
	When used outdoors	None	None
	When used indoors or in an enclosed area	None	APF 10

The tasks that Facilities Operations staff may perform on silica-containing materials that are not represented in the Table 1 list include scraping of painted drywall and plasters, light demolition activities involving handheld tools and reciprocating saws, mixing and pouring, and cleanup methods. Engineering and work practice controls will be used, employee exposure monitoring will be conducted, and respiratory protection will be employed, as necessary.

In addition to Facilities Operations staff, there may be other University staff who have the potential to be exposed to respirable crystalline silica above the action limit while performing various tasks. If these tasks fall outside the scope of Table 1, EHS will perform an exposure assessment using either the “Performance Option” or the “Scheduled Monitoring Option”, both of which are described below. If these operations exceed the AL or PEL, they will be identified in the plan along with the controls used to ensure employees are protected.

Performance Option

EHS will 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.

Scheduled Monitoring Option

Initial Exposure Assessment

Exposure monitoring will be conducted when any employee is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level. Exposure monitoring is not required if the task is listed Specified Exposure Control Methods section of this plan and the engineering controls, work practices, and PPE are used as listed. Exposure monitoring is also not required if EHS has either objective or historic data that shows employees will not be exposed above limits for the task being performed.

Periodic Exposure Assessment

Periodic exposure monitoring will take place under the following conditions:

- If the most recent results are at or above the action level but are below the permissible exposure limit (PEL), exposure monitoring will be repeated every 6 months.
- If the most recent results are at or above the PEL, exposure monitoring will be repeated within 3 months.

Periodic exposure monitoring may be discontinued if results from two consecutive sampling periods taken at least 7 days apart show that employee exposure is below the action level.

Monitoring will be conducted 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.

Employees will be notified in writing of the results of the monitoring within 15 workdays of completing the exposure assessment*. If the results indicate exposures above the PEL, then

the report will include actions that will be taken to reduce exposures. All affected employees will be included in this notification. Alternatively, the results may be posted in an appropriate location accessible to all affected employees.

**Note: Employees who fall under the scope of the Silica in Construction standard will be notified in writing of the results of the monitoring within 5 workdays of completing the exposure assessment.*

Housekeeping

Dry sweeping or dry brushing of dust containing respirable crystalline silica is prohibited. Instead, use a HEPA filtered vacuum cleaner, followed by wet mopping or wet sweeping as necessary. Wet sweeping compounds can be an acceptable dust suppression housekeeping method provided that the compounds are non-grit, oil, or wax based. If HEPA vacuuming or wet mopping/sweeping is not feasible because doing so may cause damage to equipment or create a greater hazard, then EHS must be contacted to discuss alternative cleaning methods.

Do not use compressed air to clean an employee's clothes that have become soiled with dust containing respirable crystalline silica or use compressed air to clean skin and clothing at any time. A HEPA filtered vacuum should be used to remove dust followed by laundering. Coveralls can be used to minimize the transfer of dust to other areas such as an office, break room, vehicle or home environment. Vacuum the coveralls with a HEPA filtered vacuum before removing to launder or, if disposable, place in the normal trash. Vacuum filters can also be placed in the normal trash.

Regulated and Restricted Areas

A regulated area will be established where work exposures at a fixed location are known to be at or above the PEL.

A regulated area must be separated from other areas in a way that will minimize the number of employees exposed. The following sign will be posted at each entrance to the regulated area:

DANGER, RESPIRABLE CRYSTALLINE SILICA, MAY CAUSE CANCER,
CAUSES DAMAGE TO LUNGS, WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

Only employees who have work to perform are allowed to enter a regulated area. All employees entering the regulated area must wear a respirator, regardless of the amount of time spent in the area.

Respiratory Protection

Respiratory protection is required during certain activities identified in Table 1 of this plan. It may also be required if other tasks are identified where employee exposures exceed the PEL and work practice or engineering controls are not feasible or effective enough to reduce exposures. All respirator use will comply with the OSHA Respirator Standard and the University's Respiratory Protection Program.

Medical Surveillance

Medical surveillance will be required for any employee who meets any of the following criteria:

- Exposure to respirable crystalline silica above the permissible exposure limit.
- Exposure to respirable crystalline silica at/above the action level for 30 or more days per year.
- Required to wear a respirator for 30 or more days a year (per Table 1).
- Work with crystalline silica and develop signs/symptoms of excessive exposure to respirable crystalline silica.

Medical surveillance will comply with all the requirements of 1910.1053 and 1926.1153.

Training

Training is required upon initial assignment to a job where silica-containing materials will be impacted and may result in exposures above the AL or where tasks in Table 1 are performed. This training will cover the following topics:

- Health hazards associated with 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, including engineering and work practice controls as well as respiratory protection,
- The contents and availability of the Construction and General Industry OSHA Silica Standards, as applicable,
- The identity of the competent person (for the construction related activities),
- The purpose and description of the medical surveillance program.

Record Keeping

Environmental Health & Safety will maintain employee exposure information for at least 30 years. Medical Surveillance records will be kept by the Employee Health Office for the duration of the employee's employment, plus 30 years. Medical records for staff employed by the University for less than one year need not be retained beyond the term of employment, as long as they are provided to the employee upon termination of employment.