

Reed College Silica Exposure Control Plan

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Table of Contents

1.0 Introduction	3
1.1 Purpose/Objectives	3
2.0 Roles and Responsibilities	3
2.1 Environmental Health and Safety (EHS)	3
2.2 Departments	3
2.3 Supervisors	3
2.4 Affected Employees	4
Section 3.0: Requirements	4
3.1 Exposure Limits	4
3.2 OSHA Requirements	4
3.3 Exposure Control Methods	5
3.4 Exposure Monitoring	5
3.4.1 Material Assessment	5
3.4.2 Initial Exposure Monitoring	6
3.4.3 Periodic Exposure Monitoring	6
3.4.4 Air monitoring for general industry and construction	6
3.5 Exposure Control Plan	7
3.6 Housekeeping	7
3.7 Respiratory Protection	7
3.8 Medical Surveillance	7
3.9 Recordkeeping	7
3.10 Accident and Incident Reporting	8
Appendix 1: Construction Standard Table 1	9
Appendix 2: Exposure Control Plan	15



1.0 Purpose and Scope

The purpose of this control plan is to help minimize risks and health hazards associated with exposure to respirable dust that contains silica. Requirements follow OSHA General Industry Rule (29 CFR 1910.1053) and OSHA Construction Rule (29 CFR 1926.1153). This program applies to all Reed employees who have potential to be exposed to silica at or above the action level permissible exposure limit or perform construction-related tasks.

2.0 Responsibilities of Positions

2.1 Environmental Health and Safety (EHS)

EHS staff are responsible for:

- Overseeing this program and providing consultation to Reed College employees regarding potential risks, exposure prevention, and training related to potential silica dust exposure.
- Implementing a silica exposure monitoring program.
- Designating a “competent person” and defining their responsibilities.
- Ensuring project and/or task specific Exposure Controls Plans are developed, communicated, and implemented when necessary.
- Ensuring proper training of affected employees and their supervisors related to this plan.
- Maintaining applicable records including exposure sampling, respirator fit tests, and training in accordance with OSHA regulations.
- Reviewing this plan annually and updating as necessary.

2.2 Departments

Departments with employees who could potentially be exposed to silica are responsible for:

- Ensuring applicable components of this plan are available to affected employees.
- Providing training to employees expected to work in or with building materials where there is a potential risk of silica exposure.

2.3 Supervisors

Supervisors are responsible for:

- Acting as the “Competent Person” as appropriate. This includes:
 - Being familiar with the Silica Exposure Control Plan.
 - Inspecting job sites, materials, and equipment on a regular basis.
 - Identifying existing and potential silica hazards and taking corrective action to eliminate or minimize these hazards.



- Notifying EHS when problems arise, engineering controls or work practices change, or there is an uncontrolled release of visible dust in an occupied building.
- Providing affected employees with training about this plan.
- Notifying EHS about conditions and potentially affected employees.
- Supplying appropriate equipment and personal protective equipment (PPE) to affected employees. This also includes training employees on proper use of PPE and ensuring that PPE is being used.
- Ensuring that affected employees receive medical surveillance and attend required training.

2.4 Affected Employees

Affected employees are responsible for:

- Observing procedures and requirements outlined in this plan.
- Attending training sessions.
- Complying with medical surveillance requirements.
- Wearing PPE as required.
- Notifying supervisors of changes in the workplace that have the potential to increase exposure to respirable silica.
- Report any exposure incidents or any signs or symptoms of silica illness.

Section 3.0: Requirements

3.1 Exposure Limits

Both the respirable crystalline silica general industry (29 CFR 1910.1053) and the construction (29 CFR 1926.1153) standards establish an action level (AL) and a permissible exposure limit (PEL) to reduce employee exposures to respirable silica, both of which are in micrograms of silica per cubic meter of air ($\mu\text{g}/\text{m}^3$). The AL and PEL are both 8-hour time-weighted averages (TWA). **The AL is $25 \mu\text{g}/\text{m}^3$ and the PEL is $50 \mu\text{g}/\text{m}^3$.**

3.2 OSHA Requirements

OSHA's Respirable Crystalline Silica standard for general industry requires employers to limit worker exposures to respirable crystalline silica and to take other steps to protect workers. This standard requires employers to:

- Assess employee exposures to silica if it may be at or above the AL.
- Protect employees from respirable crystalline silica exposures above the PEL.
- Limit employees' access to areas where they could be exposed to silica levels above the PEL.
- Implement dust controls to keep employees' silica exposures below the PEL.
- Provide respirators to workers when dust controls cannot limit exposures to the PEL.
- When possible, use housekeeping methods that do not create airborne dust.



- Establish and implement an Exposure Control Plan which identifies tasks and projects with exposure potential and the methods used to protect employees.
- Offer medical exams, including chest X-rays and lung function tests, every 3 years for employees exposed to silica at or above the AL for 30 or more days per year.
- Train employees on work operations that result in silica exposure and ways to limit exposure.
- Keep records of exposure measurements, objective data, and medical exams.

3.3 Exposure Control Methods

Potential silica-containing materials include brick, cement, concrete, drywall, grout, mortar, paints, plasters, roof tile, and other types of tile. Activities that could potentially impact these materials and release silica include cutting/sawing, demolishing/disturbing, drilling/coring, grinding, jackhammering, milling, mixing/pouring, sanding, scraping, and even sweeping and vacuuming. OSHA has a list of common equipment and tasks with required engineering controls and respiratory protection (Appendix 1). Exposure monitoring is not required if the methods from the table are followed.

Tasks done by Reed College employees that have a silica exposure potential are drilling concrete or block walls, mixing concrete for repairs, and housekeeping from those activities. When necessary, engineering and work practice controls will be utilized, exposure monitoring will be conducted, and respiratory protection will be used for these tasks.

3.4 Exposure Monitoring

3.4.1 Material Assessment

- If there is a potential for silica-containing materials to be involved in a project or task, sources of silica must be assessed prior to the start of the project/task. EHS will organize a building material assessment to determine silica content in materials.
- If a project is expected to generate airborne silica, EHS must be notified in order to conduct exposure monitoring and ensure all safety precautions are followed in order to minimize exposure.
- Crystalline silica is naturally occurring in the earth's crust and is a component of concrete, brick, sand, granite, asphalt, some blasting grit, and some wall spackling materials. Certain activities can lead to employee exposure to silica including:
 - Abrasive blasting
 - Jack hammering
 - Concrete crushing or drilling
 - Hoe ramming
 - Rock drilling
 - Mixing concrete or grout
 - Sawing or demolishing bricks or concrete



- Rock crushing
- Moving or dumping piles of concrete, brick, rock, or sand
- Applying or removing coatings containing silica

3.4.2 Initial Exposure Monitoring

- Initial exposure monitoring must be conducted to evaluate the potential for exposure to airborne silica.
- Any employee who is at risk of exposure through inhalation of dust needs to have an exposure monitoring program.

If initial monitoring results using TWA are...	Periodic monitoring requirements are...
Employee exposure < 25 $\mu\text{g}/\text{m}^3$	Monitoring will be discontinued
Employee exposure >25 $\mu\text{g}/\text{m}^3$ but <50 $\mu\text{g}/\text{m}^3$	Repeat monitoring within 6 months of most recent monitoring
Employees exposure is > 50 $\mu\text{g}/\text{m}^3$	Repeat monitoring within 3 months of most recent monitoring

3.4.3 Periodic Exposure Monitoring

- Whenever silica exposure levels are greater than or equal to the PEL, periodic exposure monitoring is required. The supervisor of the project must work with EHS to develop a periodic exposure monitoring schedule.
- Periodic exposure monitoring may be discontinued if the results from two consecutive sampling periods taken at least 7 days apart show employee exposure is below the PEL.

3.4.4 Air monitoring for general industry and construction

- Employers in general industry are required to conduct initial air monitoring to determine employee exposures to compare to the AL and PEL.
- Employers in construction have options depending on the activity. These are discussed in the Construction Standard Table 1 (Appendix 1). Monitoring may be conducted in accordance with either the performance option or scheduled monitoring option.
- Supervisors must notify EHS of tasks with silica exposure so that proper monitoring can be conducted.
- Observation monitoring that requires entry into an area requires the use of protective clothing or equipment. Reed College will provide observers with all necessary equipment.

3.5 Exposure Control Plan

When an employee's exposure is expected to be at or above the AL, an exposure control plan must be established and implemented for each project or task. The written plan will be reviewed



annually, at minimum, to evaluate the effectiveness and make updates, if needed. These plans must be readily available. A template for this can be found in Appendix 2. Exposure control plans containing the following:

- Descriptions of the tasks that have respirable silica exposure potential.
- Descriptions of engineering controls, work practices, and respiratory protection used to limit respirable silica exposure for those tasks.
- Descriptions of housekeeping measures that will be implemented to limit exposure.
- Descriptions of procedures used to restrict access to work areas, when necessary, to minimize exposure.

3.6 Housekeeping

- In areas where silica containing dust may be present, all surfaces must be kept free from accumulation of dust to minimize potential exposure.
- Acceptable methods for removing silica dust include the use of HEPA vacuums or wet methods (e.g. mopping).
- Unacceptable methods of silica dust removal include use of dry sweeping/brushing, vacuuming cleaners, shop vacuums, and compressed air.
- Recommended PPE must be used during silica containment and cleanup activities.
- PPE should be removed upon work completion and disposed of after each use. Ensure that contaminated PPE, including footwear, is not worn outside of work areas.

3.7 Respiratory Protection

If silica dust cannot be controlled, affected employees must be trained on and fit tested for respirators. Contact EHS (EHS@reed.edu) to schedule a fit test and training. EHS will provide affected employees with appropriate respirators and respirator cartridges.

3.8 Medical Surveillance

If an employee is exposed to silica levels above the PEL or if an employee develops any signs/symptoms of excessive exposure they must undergo medical surveillance. This includes a baseline examination and chest X-ray. These employees should be examined annually to track any changes as a result of exposure to silica.

3.9 Recordkeeping

EHS is responsible for maintaining employee exposure information and monitoring results. This information will be kept within EHS for at least 30 years.

3.10 Accident and Incident Reporting

All accidents and incidents should be reported via the [Accident/Incident Report on Etrieve](#) within 3 days of the event, preferably as soon as possible. A PDF version of the form can be found at https://www.reed.edu/human_resources/assets/downloads/AccidentIncidentForm2015.pdf



Accidents can be defined as events that result in a serious injury that goes beyond basic first aid and serious damage to equipment or property. Incidents are events that only result in minor injuries (cuts and scrapes) and cosmetic damage. Near misses of accidents or incidents should also be reported as an incident.

Accidents/Incidents dealing with property or equipment damage should be reported to risk@reed.edu and accidents/incidents dealing with injury reported to hr@reed.edu.



Appendix 1: Construction Standard Table 1

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



Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(v) Drivable saws	For tasks performed outdoors only : - 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
(vi) Rig-mounted core saws or drills	- Use tool equipped with integrated water delivery system that supplies water to cutting surface. - Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	- Use drill equipped with commercially available shroud or cowl with dust collection system. - Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. - Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with ≥99% efficiency and a filter-cleaning mechanism. - Use a HEPA-filtered vacuum when cleaning holes.	None	None
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only : - Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism. - Use a HEPA-filtered vacuum when cleaning holes.	APF 10	APF 10
(ix) Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector.	None	None
	OR Operate from within an enclosed cab and use water for dust suppression on drill bit.	None	None



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



Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(xii) Handheld grinders for uses other than mortar removal (continued)	- Use grinder equipped with commercially available shroud and dust collection system. - Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. - Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism. – When used outdoors. – When used indoors or in an enclosed area.	None	None
(xiii) Walk-behind milling machines and floor grinders	- Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface. - Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. OR - Use machine equipped with dust collection system recommended by the manufacturer. - Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. - Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. - When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.	None	None
(xiv) Small drivable milling machines (less than half-lane)	- Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant. - Operate and maintain machine to minimize dust emissions.	None	None



Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(xv) Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only:	None	None
	• Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. • Operate and maintain machine to minimize dust emissions.		
	For cuts of four inches in depth or less on any substrate:	None	None
	• Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. • Operate and maintain machine to minimize dust emissions.		
	OR		
	• Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant. • Operate and maintain machine to minimize dust emissions.	None	None
(xvi) Crushing machines	• Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g. hoppers, conveyers, sieves/sizing or vibrating components, and discharge points). • Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions. • Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station.	None	None



Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g. hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	- Operate equipment from within an enclosed cab. - When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None
(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: demolishing, abrading, or fracturing silica-containing materials	- Apply water and/or dust suppressants as necessary to minimize dust emissions. OR - When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None	None



Appendix 2: Exposure Control Plan

Department/Unit: _____ Date: _____

Person Completing the Plan/Title: _____

Competent Person: _____

Job site/Location: _____

Description of Task: _____

(Routine task, new task, indoors/outdoor, task found in Table 1)

☐ 1910.1053 General Industry (GI) (References Table 1)

- Review necessary? Y or N

☐ 1926.1153 Construction (Includes Table 1)

- Review necessary? Y or N

Engineering Controls (any deviation from Table 1 requires air monitoring. Engineering controls must be used at all times):

Work Practices:

Respiratory Protection:

Housekeeping:

Procedures Used to Restrict Access to Work Area (Construction = required, GI = optional):

Additional Notes:

