

# University of Portland



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## RESPIRABLE SILICA CONTROL PROGRAM



**UNIVERSITY OF PORTLAND**

*PORTLAND, OREGON*



**MAY 2024**

# RESPIRABLE SILICA CONTROL PROGRAM



## RESPIRABLE SILICA CONTROL PROGRAM

### Table of Contents

1.0 POLICY AND PURPOSE.....	1
2.0 RESPONSIBILITIES.....	1
3.0 DEFINITIONS.....	3
4.0 MATERIAL ASSESSMENT.....	3
5.0 EXPOSURE MONITORING.....	4
6.0 EXPOSURE CONTROL.....	5
PPE.....	6
7.0 HOUSEKEEPING OF FACILITIES.....	7
8.0 LABELS AND OTHER WARNINGS.....	8
9.0 EMPLOYEE TRAINING.....	8
10.0 MEDICAL MANAGEMENT PROGRAM.....	8
11.0 RESPIRATORY PROTECTION.....	9
12.0 RECORDKEEPING.....	9
APPENDICES	
○ APPENDIX A: TABLE 1.....	10
○ APPENDIX B: PARTICULATE RESPIRATORY PROTECTION – FILTER TYPES.....	16
○ APPENDIX C: LOG FORMS.....	18



## RESPIRABLE SILICA CONTROL PROGRAM

### 1.0 POLICY AND PURPOSE

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University of Portland has established this Respirable Silica Control Program that includes all employees exposed to respirable crystalline silica at or above the OSHA Action Level in this program. The program includes engineering and work practice controls to reduce silica exposures, providing appropriate respiratory protection, and employee training. When engineering and work practices do not suffice the program includes air monitoring to assess employee exposures and medical examinations (with emphasis on the lungs) to monitor employees' health.



The purpose of this program is to prevent occupational disease, primarily silicosis, from silica exposures in the workplace. The program applies to employees in all departments at University of Portland.

University of Portland has assigned the Environmental Health and Safety Officer to the overall responsibility for this Respirable Silica Control Program, who reviews and updates the program as necessary. A copy of this Respirable Silica Control Program may be obtained from the main University of Portland Human Resources office and is available online at the <https://www.up.edu/ehs/index.html>.

Under this program, employees are informed of:

- ✓ The possible effects of silica exposure on their health
- ✓ The control measures implemented to reduce exposures
- ✓ The purpose and selection of respiratory protection and instructions on fitting, use and care (See the University of Portland *Respiratory Protection Program* for full details).
- ✓ When applicable, the purpose and requirements of medical monitoring

### 2.0 RESPONSIBILITIES

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University of Portland firmly believes protecting the health and safety of our employees is everyone's responsibility. This responsibility begins with Human Resources, Facilities managers, and Environmental Health and Safety providing the necessary support to properly implement this program. However, all levels of the organization assume some level of responsibility for this program.

**University of Portland Environmental Health and Safety:**

- Conducts job site assessments for Silica containing materials and perform employee Respirable Crystalline Silica hazard assessments in order to determine if an employee's exposure are above 25  $\mu\text{g}/\text{m}^3$  as an 8-hour TWA *under any foreseeable conditions*.
- Selects and implements the appropriate control measures in accordance with OSHA's standards and potentially including a written Exposure Control Plan (ECP), exposure monitoring, Hazard Communication training, medical surveillance, housekeeping and others.
- Ensures that the materials, tools, equipment, personal protective equipment (PPE), and other resources (such as employee training) required to fully implement and maintain this Respirable Silica Control Program are in place and readily available if needed.
- Ensures that all employees exposed to silica are educated in the hazards of Silica exposure and trained to work safely with silica in accordance with OSHA's standards.
- Maintains required written records, for example, records of training, records of respiratory training, inspections, medical surveillance, and respirator fit-test results.
- Conducts an annual review (or more often if conditions change) of the effectiveness of this program and a review of available dust control technologies to ensure these are selected and used when practical.



**University of Portland Project Managers/Supervisors/Leads:**

- Ensure all applicable elements of this Respirable Silica Control Program are implemented properly.
- Ensure job site assessments for silica containing materials and hazard assessments are conducted as necessary.
- Assist in the selection and implementation of the appropriate control measures in accordance with OSHA standards.
- Ensure that employees using respirators have been properly trained, medically cleared, and fit-tested in accordance with the University of Portland *Respiratory Protection Program*. The Respiratory Protection Program is available on the EHS website (<https://www.up.edu/ehs/index.html>).
- Ensure that work is conducted in a manner that minimizes and adequately controls the risk to workers and others. This includes ensuring that workers use appropriate engineering controls, work practices, and wear the necessary PPE.
- Where there is risk of exposure to Silica dust, verify employees are properly trained on the applicable contents of this program, the project-specific ECP, and the applicable OSHA Standards (such as Hazard Communication). Ensure employees are provided appropriate PPE when conducting such work.



**Employees:**

- Follow all work procedures as established in this program.
- Use the assigned PPE in an effective and safe manner.
- Participate in exposure monitoring and the medical surveillance program.
- Report any unsafe conditions or acts to their supervisor.



- Report any exposure incidents or any signs or symptoms of Silica illness.

### 3.0 DEFINITIONS

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**Action Level** means a concentration of airborne respirable crystalline silica of 25 micrograms per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) or 0.025 milligrams per cubic meter of air ( $\text{mg}/\text{m}^3$ ).

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

**HEPA** means High Efficiency Particulate Air. A filtering system capable of trapping and retaining at least 99.97% of all particles of 0.3 micron in diameter and larger.

**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.

**Permissible Exposure Limit (PEL)** means a concentration of airborne respirable crystalline silica of 50  $\mu\text{g}/\text{m}^3$  or 0.05  $\text{mg}/\text{m}^3$ , calculated as an 8-hour Time Weighted Average (TWA).

**Silica containing material** means any material, which has the potential to contain silica at levels, which may pose a hazard to employees when the material is manipulated to create airborne particles

**Silicosis** means a lung disease caused by inhalation of silica dust. Silica dust can cause fluid buildup and scar tissue in the lungs that cuts down the ability for the lungs to fully function. The disease is not curable, but can be prevented through the use of protective systems.

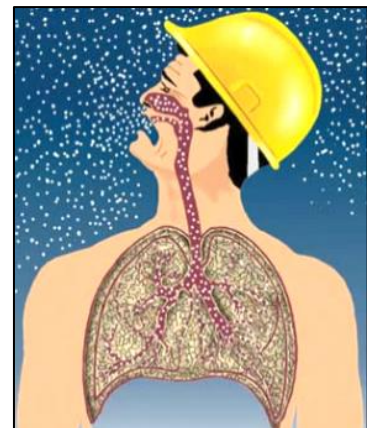
### 4.0 MATERIAL ASSESSMENT

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Any time there is a potential for silica containing materials to be involved in a project, sources of silica will be assessed prior to disturbing. University of Portland Environmental Health and Safety and Project Managers will perform building material assessments to determine silica content in materials.

Crystalline silica occurs naturally in the earth's crust and is a basic component of sand, concrete, brick, asphalt, granite, some blasting grit and wall spackling materials. Employees can be exposed to silica when conducting activities such as:

- Cutting silica-containing countertops
- Polishing and shaping silica-containing countertops
- Cutting silica-containing cement-board siding
- Abrasive blasting
- Rock drilling and rock crushing
- Jack hammering, concrete crushing, chipping or scarifying concrete
- Bulk mixing of grout
- Sawing concrete, concrete blocks, or bricks
- Using coatings containing silica or removing coatings containing silica
- Using some joint compounds that contain silica



If airborne silica is expected to be generated during a University of Portland project, then all safety precautions will be followed to minimize exposure to airborne silica dust and ensure that University of Portland employees are not exposed to respirable silica dust above allowable levels. University of Portland employees will strive to follow the controls outlined in Table 1.

## **5.0 EXPOSURE MONITORING**

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**If employees are unable to follow the administrative and engineering controls in Table 1, exposure monitoring is necessary.**

### **Initial Exposure Monitoring**

If University of Portland employees expected to come in contact/work with silica containing materials where there is a risk of exposure through inhalation of dust and employees are not able to use the controls outlined in Table 1, University of Portland should conduct initial exposure monitoring.

Initial exposure monitoring is conducted by University of Portland to quantitatively evaluate the exposure to airborne silica. A template for exposure monitoring is available in Appendix B.

Exposure monitoring is conducted on any employee exposed to airborne silica dust as levels may vary based on job duty within a project. For example, the employee performing granite cutting vs an employee providing supervision during the work.

### **Periodic Exposure Monitoring**

Whenever silica exposure levels are greater than, or equal to the Permissible Exposure Level, periodic exposure monitoring is conducted. Exposure monitoring is annual and uses the following threshold:

***Measured Concentration: Permissible Exposure Level = 50 µg/m<sup>3</sup>, calculated as an 8-hour TWA***

Exposure monitoring is not required by every employee at risk of airborne silica exposure. Enough sampling must be done to enable the employee's exposure level to be reasonably represented.



Exposure monitoring is not required when following the requirements of Table 1.

### **Termination of Exposure Monitoring**

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 PEL.

### **Sampling Methods**

Personal exposure monitoring will be conducted using an approved NIOSH method.

Monitoring records include the following:

- The date, number, duration, location and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable.
- A description of the sampling and analytical methods used.
- The type of respiratory protective devices, if any.
- Name and job classification of the employee monitored.
- Any environmental variables that could affect the measurement of the employee exposure.

**Reporting of Exposure Monitoring Results**

University of Portland informs employees of exposure monitoring results within 15 working days from when the results become available.

If levels are measured during the exposure monitoring exceed the PEL, University of Portland implements the steps and controls to reduce exposure to below the PEL.

Follow up exposure monitoring may be necessary if engineering or administrative controls are put in place to reduce hazardous exposures.

**6.0 EXPOSURE CONTROL**

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**Pre-project Planning**

Prior to projects taking place affecting University of Portland employees, planning documents and jobsites are reviewed to account for potential exposures to hazardous materials including silica. During the planning process, any silica containing materials are addressed and methods for exposure control are provided prior to work beginning.

If silica containing materials are to be disturbed during the project, the appropriate exposure control methods are implemented.

**Administrative/Engineering Controls**

Where silica exposures at or above the Permissible Exposure Limit have been documented, or are expected, appropriate engineering or administrative controls are implemented, wherever feasible. Follow-up exposure monitoring may be necessary when administrative or engineering exposure controls are utilized.

At University of Portland, controls can involve:

- Local exhaust ventilation
- General ventilation
- Vacuum methods with HEPA filters
- Containment
- Use of water to keep dust down
- Substituting non-silica containing materials for use while abrasive blasting
- Distance (keeping employees away from silica dust areas)
- Dust control products
- Personal Protective Equipment



**Personal Protective Equipment (PPE)**

In addition to administrative/engineering controls, University of Portland employees may be required to wear specific PPE during the disturbance of silica containing materials and/or when airborne silica is present. The level of protection will depend on the task being conducted and the tools being utilized to complete the task.

Required PPE may include:

- Safety glasses or goggles
- Face shield
- Respiratory Protection
  - N95 Respirator Mask
  - Half-face with HEPA filters
  - Full-face with HEPA filters
- Disposable or reusable work clothing to keep from spreading the dust or bringing the dust home
- Leather gloves
- Boot covers or rubber boots



This table indicates the respiratory protection levels based on measured or anticipated exposure levels:

Respirator	Protection Factor	Typical Silica Activity
N95 Respirator Mask	Less than 50 µg/m <sup>3</sup>	- Used on voluntary basis to control low exposures
Half-face with HEPA filters	50 – 500 µg/m <sup>3</sup>	- Power polishing tools with dust collection - Power cutting tools with dust collection - Housekeeping (wet method) - Concrete cutting (wet method)
Full-face with HEPA filters	500 – 5,000 µg/m <sup>3</sup>	- Silica-countertop cutting without dust collection - Power polishing tools without dust collection - Mixing grout in bulk - Vacuum abrasive blasting
SCBA- not worn by University of Portland employees	Above 5,000 µg/m <sup>3</sup>	- Abrasive blasting

**SILICOSIS WARNING**



Disposable paper and fiber dust masks **DO NOT** protect from the dangerous silica dust that causes silicosis. When source controls cannot keep exposures below the silica REL, *use of effective respirators is mandatory by law*. Fit-testing respirators, proper cleaning, and storage are required for respiratory protection.





**7.0 HOUSEKEEPING OF FACILITIES**

In areas where silica containing dust may be present, all surfaces are to be maintained free from accumulations of dust to minimize potential silica exposure. Dust and other silica containing debris are to be removed from the work area as soon as possible.



➔ **Acceptable** method of silica dust removal includes the use of HEPA vacuum or wet methods such as wet mopping.

➔ **Unacceptable** methods of silica dust removal include dry sweeping, vacuum cleaners, shop vacuums, and compressed air.



University of Portland employees are required to follow all Standard Operating Procedures and instructions outlined in this plan and utilize required PPE during silica containing debris cleanup activities.

**Hygiene Procedures**

The following hygiene procedures have been implemented to reduce employee exposures at the site and the potential for contamination of the employees' vehicle and home. Environmental Health and Safety, Project Managers, and Shop supervisors are responsible for enforcing hygiene procedures.

- Smoking, eating, and drinking are prohibited in areas with potential silica exposure.
- Employees' work clothing must be HEPA-filtered vacuumed before entering the lunch and break area and before removal at the end of the shift. (Cleaning of work clothing by shaking or blowing with compressed air is prohibited.)
- Work clothing must be removed at the end of the shift and employees must change into clean clothes prior to leaving the site.
- Employees must wash hands after working in a silica containing area. It is recommended that employees shower prior to leaving work.
- Ensure contaminated PPE, including footwear, is not worn outside of work areas.



**Exposure Control Plan**

A written Silica Exposure Control Plan is used when respirable silica exposure will or are anticipated to be at or above the PEL. Each Exposure Control Plan (ECP) contains the following information:

1. A description of the tasks in the workplace that involve exposure to respirable crystalline silica;
2. A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task; and,
3. A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica.

The effectiveness of the written exposure control plan is reviewed and assessed at least annually and is updated as necessary.

## **RESPIRABLE SILICA CONTROL PROGRAM**

The written exposure control plan is available for examination and copying, upon request, to each employee. The written exposure control plan will also be uploaded to the Facilities shared drive for documentation purposes (This plan can be emailed to the EHS Officer at [ehs@up.edu](mailto:ehs@up.edu) for upload).

### **8.0 LABELS AND OTHER WARNINGS**

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The University of Portland purchasing department manager is responsible for working with shop leads and EHS to ensure that new materials, countertops, and other products containing more than 0.1% crystalline silica will have required specific labels, and Safety Data Sheets are on file and available to employees. Regularly used products such as joint compound or any other products that contain more than 0.1% crystalline silica will be uploaded into the university's Safety Datasheet database.

The purpose of warning signs and labeling is to inform and alert workers of the presence and type of hazard associated with the area or product so that appropriate precautions may be taken.

### **9.0 EMPLOYEE TRAINING**

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As part of the University of Portland *Hazard Communication Program*, employees who work with silica are informed of the following information about silica:

- ✓ Information about the potential health effects and symptoms of exposure to respirable silica
- ✓ How to access safety data sheets for silica, quartz, and applicable products containing silica
- ✓ The use of engineering controls, work practices, good housekeeping and PPE to control exposure to silica
- ✓ Use and care of PPE
- ✓ Expected exposures to silica dust
- ✓ Exposure monitoring process
- ✓ Medical surveillance process if required



Respiratory protection training, medical clearance, and quantitative fit testing is required under the University of Portland [Respiratory Protection Program](#).

Environmental Health and Safety reviews the employee training program and advises departments and supervisors on training and retraining needs. As part of the assessment of the training program, input from employees regarding the training they have received, and any suggestions for improvement is solicited.

### **10.0 MEDICAL MANAGEMENT PROGRAM**

**11.0** All University of Portland employees exposed to crystalline silica above the OSHA Action Level are included in the medical management program if employees are not able to use Table 1 to reduce exposure via administrative or engineering controls. Employees assigned to the following departments or areas may be included in the program if it is deemed necessary:



- Facilities- Carpentry Shop
- Facilities- Grounds Shop

University of Portland strives to maintain exposure levels below the Permissible Exposure Level (50 µg/m<sup>3</sup>). If Employees are exposed to silica levels above the Permissible Exposure Limit (50 µg/m<sup>3</sup>) or if an employee working with silica develops signs or symptoms of excessive exposure, they will be enrolled in a Medical Surveillance Program.

All medical surveillance, including baseline and periodic medical examinations and evaluation of chest x-rays is performed by a third-party medical provider. Results are provided to the affected employee and their supervisor as soon as they are received from the third-party vendor. If problem chest x-rays occurred, further evaluation is needed and medical test results should be discussed with a physician.

### **12.0 RESPIRATORY PROTECTION**

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All employees exposed to crystalline silica above the OSHA Action Level are included in the University of Portland [Respiratory Protection Program](#).

Appropriate respirators are selected based on the employee exposure levels. Employees are fit tested to ensure an adequate fit. Employees are then trained in the use and care of respiratory protection as part of the training program. All employees who are required to wear a respirator for silica exposure must undergo a yearly FIT test of their respirator.

### **13.0 RECORDKEEPING**

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Records are maintained, and made available to employees upon request, for all medical examinations, air sampling surveys and training sessions. Employees' requests for records should be directed to the Environmental Health and Safety.

- Survey information includes sampling and analytical methods; type of personal protective equipment, if any, in use at the time of sampling; and the monitoring results.
- In accordance with 29 CFR 1910.1020/1926.1020, medical records are maintained for at least 30 years following the employee's termination of employment, unless the employee is employed for less than one year and the records are provided to the employee upon termination.
- Each employee may obtain information on his/her exposure and medical examinations. Contact Environmental Health and Safety at [ehs@up.edu](mailto:ehs@up.edu) for information on required medical examinations or exposures.

**APPENDIX A** **TABLE 1**  
**Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica**  
***NOTE: TABLE 1 IS USED FOR CONSTRUCTION WORK (IN GENERAL INDUSTRY)***  
***FOR NON-CONSTRUCTION WORK, IT IS TO BE USED ONLY FOR GENERAL INFORMATION.***

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
1 <input type="checkbox"/>	Stationary masonry saws	<ul style="list-style-type: none"> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None
2a <input type="checkbox"/>	Handheld power saws (any blade diameter) when used outdoors	<ul style="list-style-type: none"> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	N95 (or Greater) Filtering Facepiece or Half Mask
2b <input type="checkbox"/>	Handheld power saws (any blade diameter) when used indoors or in an enclosed area	<ul style="list-style-type: none"> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	N95 (or Greater) Filtering Facepiece or Half Mask	N95 (or Greater) Filtering Facepiece or Half Mask
3 <input type="checkbox"/>	Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less) for tasks performed outdoors only	<ul style="list-style-type: none"> <li>Use saw equipped with commercially available dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.</li> </ul>	None	None
4a <input type="checkbox"/>	Walk-behind saws when used outdoors	<ul style="list-style-type: none"> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None
4b <input type="checkbox"/>	Walk-behind saws when used indoors or in an enclosed area	<ul style="list-style-type: none"> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	N95 (or Greater) Filtering Facepiece or Half Mask	N95 (or Greater) Filtering Facepiece or Half Mask
5 <input type="checkbox"/>	Drivable saws for tasks performed outdoors only	<ul style="list-style-type: none"> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None
6 <input type="checkbox"/>	Rig-mounted core saws or drills	<ul style="list-style-type: none"> <li>Use tool equipped with integrated water delivery system that supplies water to cutting surface.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
7 <input type="checkbox"/>	Handheld and stand-mounted drills (including impact and rotary hammer drills)	<ul style="list-style-type: none"> <li>Use drill equipped with commercially available shroud or cowling with dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> <li>Use a HEPA-filtered vacuum when cleaning holes.</li> </ul>	None	None
8 <input type="checkbox"/>	Dowel drilling rigs for concrete for tasks performed outdoors only	<ul style="list-style-type: none"> <li>Use shroud around drill bit with a dust collection system.</li> <li>Dust collector must have a filter with 99% or greater efficiency and a filter cleaning mechanism.</li> <li>Use a HEPA-filtered vacuum when cleaning holes.</li> </ul>	N95 (or Greater) Filtering Facepiece or Half Mask	N95 (or Greater) Filtering Facepiece or Half Mask
9a <input type="checkbox"/>	Vehicle-mounted drilling rigs for rock and concrete	<ul style="list-style-type: none"> <li>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.</li> </ul>	None	None
9b <input type="checkbox"/>	Vehicle-mounted drilling rigs for rock and concrete	<ul style="list-style-type: none"> <li>Operate from within an enclosed cab and use water for dust suppression on drill bit.</li> </ul>	None	None
10a <input type="checkbox"/>	Jackhammers and handheld powered chipping tools when used outdoors	<ul style="list-style-type: none"> <li>Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.</li> </ul>	None	N95 (or Greater) Filtering Facepiece or Half Mask
10b <input type="checkbox"/>	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	<ul style="list-style-type: none"> <li>Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.</li> </ul>	N95 (or Greater) Filtering Facepiece or Half Mask	N95 (or Greater) Filtering Facepiece or Half Mask
10c <input type="checkbox"/>	Jackhammers and handheld powered chipping tools when used outdoors	<ul style="list-style-type: none"> <li>Use tool equipped with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> </ul>	None	N95 (or Greater) Filtering Facepiece or Half Mask

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
10d <input type="checkbox"/>	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	<ul style="list-style-type: none"> <li>Use tool equipped with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> </ul>	N95 (or Greater) Filtering Facepiece or Half Mask	N95 (or Greater) Filtering Facepiece or Half Mask
11 <input type="checkbox"/>	Handheld grinders for mortar removal (i.e., tuckpointing)	<ul style="list-style-type: none"> <li>Use grinder equipped with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> </ul>	N95 (or Greater) Filtering Facepiece or Half Mask	Powered Air-Purifying Respirator (PAPR) with P100 Filters
12a <input type="checkbox"/>	Handheld grinders for uses other than mortar removal for tasks performed outdoors only	<ul style="list-style-type: none"> <li>Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None
12b <input type="checkbox"/>	Handheld grinders for uses other than mortar removal when used outdoors	<ul style="list-style-type: none"> <li>Use grinder equipped with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> </ul>	None	None
12c <input type="checkbox"/>	Handheld grinders for uses other than mortar removal when used indoors or in an enclosed area	<ul style="list-style-type: none"> <li>Use grinder equipped with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> </ul>	None	N95 (or Greater) Filtering Facepiece or Half Mask
13a <input type="checkbox"/>	Walk-behind milling machines and floor grinders	<ul style="list-style-type: none"> <li>Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None
13b	Walk-behind milling machines and floor grinders	<ul style="list-style-type: none"> <li>Use machine equipped with dust collection system recommended by the manufacturer.</li> </ul>	None	None

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
<input type="checkbox"/>		<ul style="list-style-type: none"> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> <li>When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.</li> </ul>		
14 <input type="checkbox"/>	Small drivable milling machines (less than half-lane)	<ul style="list-style-type: none"> <li>Use a machine equipped with supplemental water sprays designed to suppress dust.</li> <li>Water must be combined with a surfactant.</li> <li>Operate and maintain machine to minimize dust emissions.</li> </ul>	None	None
15a <input type="checkbox"/>	Large drivable milling machines (half-lane and larger) for cuts of any depth on asphalt only	<ul style="list-style-type: none"> <li>Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.</li> <li>Operate and maintain machine to minimize dust emissions.</li> </ul>	None	None
15b <input type="checkbox"/>	Large drivable milling machines (half-lane and larger) for cuts of four inches in depth or less on any substrate	<ul style="list-style-type: none"> <li>Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.</li> <li>Operate and maintain machine to minimize dust emissions.</li> </ul>	None	None
15c <input type="checkbox"/>	Large drivable milling machines (half-lane and larger) for cuts of four inches in depth or less on any substrate	<ul style="list-style-type: none"> <li>Use a machine equipped with supplemental water spray designed to suppress dust.</li> <li>Water must be combined with a surfactant.</li> <li>Operate and maintain machine to minimize dust emissions.</li> </ul>	None	None
16 <input type="checkbox"/>	Crushing machines	<ul style="list-style-type: none"> <li>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).</li> <li>Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station.</li> </ul>	None	None
17a <input type="checkbox"/>	Heavy equipment and utility vehicles used to abrade/ fracture silica-containing materials or used during	<ul style="list-style-type: none"> <li>Operate equipment from within an enclosed cab.</li> </ul>	None	None



Construction Task or Equipment Operation	Engineering and Work Practice Control Methods	Required Respiratory Protection	
		≤ 4 hours/shift	>4 hours/shift
demolition activities involving silica-containing materials			
<b>17b</b> <input type="checkbox"/> 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	<ul style="list-style-type: none"> <li>When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.</li> </ul>	None	None
<b>18a</b> <input type="checkbox"/> Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing silica-containing materials	<ul style="list-style-type: none"> <li>Apply water and/or dust suppressants as necessary to minimize dust emissions.</li> </ul>	None	None
<b>18b</b> <input type="checkbox"/> Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing silica-containing materials	<ul style="list-style-type: none"> <li>When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.</li> </ul>	None	None

**When implementing the control measures specified in Table 1, University of Portland ensures:**

- For tasks performed indoors or in enclosed areas, a means of exhaust as needed to minimize the accumulation of visible airborne dust is provided
- For tasks performed using wet methods, water at flow rates sufficient to minimize release of visible dust is applied
- For measures implemented that include an enclosed cab or booth, that the enclosed cab or booth:
  - Is maintained as free as practicable from settled dust
  - Has door seals and closing mechanisms that work properly
  - Has gaskets and seals that are in good condition and working properly
  - Is under positive pressure maintained through continuous delivery of fresh air
  - Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 μm range (e.g., MERV-16 or better)
  - Has heating and cooling capabilities
  - Employees are trained in reducing secondary silica dust exposures



## RESPIRABLE SILICA CONTROL PROGRAM



- Where an employee performs more than one task included on OSHA's Construction Standard 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.

**RESPIRABLE SILICA CONTROL PROGRAM**



**APPENDIX B SILICA DUST HAZARD ASSESSMENT LOG AND EXPOSURE CONTROL PLAN**

USE THIS PLAN IF YOU ARE NOT ABLE TO FOLLOW THE CONTROL METHODS IN TABLE 1 (APPENDIX A)

Date:		Location:			Assessor Name:		
Task	Hazard	Measured Exposure Level (8 hr. TWA*)	PEL	Engineering Controls Implemented	Administrative Controls Implemented	PPE Controls Implemented	
<i>Example:</i> Cutting granite countertops	Silica Dust	62 µg/m3	50 µg/m3	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 5	
Mark tasks not found in table 1 & do an exposure monitor here or find obj data	Silica Dust		50 µg/m3	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
	Silica Dust		50 µg/m3	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
	Silica Dust		50 µg/m3	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
	Silica Dust		50 µg/m3	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
	Silica Dust		50 µg/m3	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
	Silica Dust		50 µg/m3	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	

Engineering Controls Implemented	Administrative Controls Implemented	PPE Controls Implemented
1 Exhaust Fan	1 Wetting (wet mopping; no dry sweeping)	1 N-95 Respirator
2 Local Exhaust Ventilation	2 Signs posted notifying of silica dust hazard areas	2 P-100 HEPA Filter
3 Partial Enclosure	3 Housekeeping (debris promptly picked up, etc.)	3 P-100 Combo Filter
4 Full Enclosure	4 Work clothing not worn outside of silica dust areas	4 ½ Face Negative Pressure Respirator
5 Distance barriers	5 No smoking, eating or drinking within dust areas	5 Other:
6 HEPA Dust Collection System	6 Employees vacuumed-off before rest/meal breaks	
7 Other	7 Other	

**APPENDIX B**

**PARTICULATE RESPIRATORY PROTECTION – FILTER TYPES**

**Respirator Recommendations**



**Up to 0.5 mg/m<sup>3</sup>:**

- (APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators.
- The following filters may also be used: N99, R99, P99, N100, R100, P100.

**Up to 1.25 mg/m<sup>3</sup>:**

- (APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.
- (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

**Up to 2.5 mg/m<sup>3</sup>:**

- (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
- (APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter

**Up to 25 mg/m<sup>3</sup>:**

- (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode – UP doesn't use.

**Emergency or planned entry into unknown concentrations or IDLH conditions:**

- (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
- (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

**Escape:**

- (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
- Any appropriate escape-type, self-contained breathing apparatus

APPENDIX C

LOG FORMS

Silica Dust Hazard Assessment Log

Date:		Jobsite:		
Task	Hazard	Measured Exposure Level (8 hr. TWA*)	PEL	Controls Implemented
<i>Example:</i> Cutting granite countertops	Silica Dust	62 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	<ul style="list-style-type: none"> <li>• ½ Face Respirator</li> <li>• Silica Hazard signs posted</li> <li>• Work clothing not worn outside of dust areas</li> <li>• No smoking, eating or drinking within dust areas</li> <li>• Local exhaust system used</li> </ul>
	Silica Dust		50 µg/m <sup>3</sup>	
	Silica Dust		50 µg/m <sup>3</sup>	
	Silica Dust		50 µg/m <sup>3</sup>	
	Silica Dust		50 µg/m <sup>3</sup>	