



DEPARTMENT OF
ENVIRONMENTAL SAFETY,
SUSTAINABILITY & RISK

Respirable Crystalline Silica Program

Created 2017

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I. PURPOSE

The University of Maryland (UMD) respirable crystalline silica program has been developed to address and control potential exposures to prevent employees from occupational illnesses related to respirable crystalline silica exposure. It is written in compliance with the federal Occupational Safety and Health Administration (OSHA) respirable crystalline silica standards for General Industry/Maritime (29 CFR 1910.1053) and Construction (29 CFR 1926.1153).

Crystalline silica is a basic component of soil, sand, granite and many other minerals. Quartz is its most common form. Materials composed of crystalline silica, include, but is not limited to, the following: concrete, asphalt, pre-formed structures (inlets, pipe, etc.). All work involving chipping, cutting, drilling, grinding, or similar activities of materials containing crystalline silica can lead to the release of respirable-sized particles.

This respirable crystalline silica program will designate responsibilities to prevent and/or reduce employee exposure to hazardous levels of respirable crystalline silica that could result from work activities. Respirable crystalline silica exposure at hazardous levels can lead to lung cancer, silicosis, chronic obstructive pulmonary disease, and kidney disease.

II. SCOPE

This program applies to all employees who have the potential to be exposed to respirable crystalline silica. It applies to all occupational exposures to respirable crystalline silica in construction and general industry work, with the exception of the following:

- A. Where the employer has objective data demonstrating employee exposure will remain below 25 micrograms of respirable crystalline silica per cubic meter of air (25 $\mu\text{g}/\text{m}^3$) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.
- B. Agricultural operations covered under 29 CFR 1928; and
- C. Exposures that result from the processing of sorptive clays.
- D. In addition to the requirements of this program, UMD will comply with other programs and OSHA standards (such as 29 CFR 1926.57 [Ventilation]), when applicable where abrasive blasting is conducted using Crystalline Silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain Crystalline Silica.

III. DEFINITIONS

- **Action Level** means a concentration of airborne respirable crystalline silica of 25 $\mu\text{g}/\text{m}^3$, calculated as an 8-hour 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 shall 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.
- **Specialist** means an American Board Certified Specialist in Pulmonary Disease or an American Board Certified Specialist in Occupational Medicine.

IV. RESPONSIBILITIES

Responsibilities for implementing the respirable crystalline silica program are as follows:

A. Department of Environmental Safety, Sustainability and Risk (ESSR)

- Assist 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.
- Update, when necessary, the Exposure Control Plan (ECP) included in this program with the appropriate control measures for any task identified to ESSR that involves exposure to respirable crystalline silica. This plan is in accordance with the Construction Tasks identified in OSHA's Construction Standard Table 1; and potentially including (but not limited to) - exposure monitoring, Hazard Communication training, medical surveillance, and housekeeping. (See Appendix A)
 - OSHA's Construction Standard Table 1 is a list of 18 common construction tasks along with acceptable exposure control methods and work practices that limit exposure for those tasks.
 - A site-specific ECP for respirable crystalline silica must be completed by the competent person as described below.
- Ensure that UMD employees are educated in the hazards of silica and trained to work safely with it in accordance with OSHA's respirable crystalline silica standards and OSHA's hazard communication standard.
- Maintain the UMD respiratory protection plan, including written records of respirator training and respirator fit test results.
- Conduct an annual review of the effectiveness of this program.

B. Directors, Project Managers, Lab Managers, and Competent Person

- Identify a competent person to implement this respirable crystalline silica program.
- The duties of the competent person are as follows:
 - Make frequent and regular inspections of job/project sites, materials, and equipment to implement the written ECP.
 - Identify existing and foreseeable respirable crystalline silica hazards in the workplace and take prompt corrective measures to eliminate or minimize them.

- Notify the project manager and ESSR of any deficiencies identified during inspections in order to coordinate and facilitate prompt corrective action.
 - Assist the Project Manager and ESSR in conducting job site assessments for silica containing materials.
 - Perform employee respirable crystalline silica hazard assessments in order to determine if an ECP, exposure monitoring, and medical surveillance is necessary.
- Conduct job site assessments for silica containing materials.
 - Perform respirable crystalline silica hazard assessments, to determine if an ECP, exposure monitoring, and medical surveillance are necessary.
 - Select and implement the appropriate control measures in accordance with the Construction Tasks identified in OSHA's Construction Standard Table 1.
 - Complete a site-specific written Exposure Control Plan (ECP), schedule exposure monitoring with ESSR (if necessary), schedule and/or conduct hazard communication training, schedule medical surveillance, and perform housekeeping.
 - Ensure that the materials, tools, equipment, personal protective equipment (PPE), and other resources (such as employee training) required to implement and maintain this respirable crystalline silica program fully are in place and readily available if needed.
 - Ensure that employees using respirators have been trained, medically cleared, and fit-tested in accordance with the UMD respiratory protection program.
 - Ensure that work is conducted in a manner that minimizes and adequately controls the risk to employees and others. This includes ensuring that employees use appropriate engineering controls, work practices, and/or wear the necessary PPE.
 - Where there is risk of exposure to dust, verify employees are properly trained on the relevant contents of this program, the specific ECP, and the applicable OSHA standards (such as hazard communication). Ensure employees are provided the appropriate PPE when conducting such work.

C. Employees

- Follow recognized work procedures (such as the construction tasks identified in OSHA's construction standard - Table 1) as established in the project's ECP and this program.
- Use assigned PPE in an effective and safe manner.

- Participate in respirable crystalline silica exposure monitoring and medical surveillance program.
- Report any unsafe conditions or acts to the site manager and/or competent person.
- Report any exposure incidents or any signs or symptoms of silica illness.

E. University Health Center

- Outline the procedures for employees working with respirable crystalline prior to entering the workplace and for periodic follow-up.
- Conduct initial examination that includes the following:
 - Medical and work history with emphasis on past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system
 - Any history of respiratory system dysfunction, including signs and symptoms of respiratory disease
 - History of tuberculosis
 - Smoking status and history
 - A physical examination with special emphasis on the respiratory system
 - A chest x-ray interpreted and classified by a NIOSH-certified B reader
 - A pulmonary function test administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course
 - Testing for latent tuberculosis infection
 - Any other tests deemed appropriate by the PLHCP.
- Determine an employee's fitness to use a respirator.
- Medical examinations shall be made available every three years, or more frequently if recommended by the PLHCP.

See Appendix B for information included in the Health Center questionnaire.

V. 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
- Exposure Control Plan
- Housekeeping
- Respiratory protection
- Training
- Medical Surveillance

A. Exposure Limits

Both the respirable crystalline silica general industry/maritime (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.

- The AL is 25 micrograms of silica (all 3 forms) per cubic meter of air ($\mu\text{g}/\text{m}^3$).
- The PEL is 50 $\mu\text{g}/\text{m}^3$. UMD shall 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.
- Both the AL and the PEL are 8-hour time-weighted averages (TWA).

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 below in the Construction Standard *Table 1*. Monitoring may be conducted in accordance with either the performance option or the scheduled monitoring option.
- **Directors, supervisor, lab managers, and supervisors must notify ESSR when tasks with silica exposure so that monitoring can be coordinated.**

- Where air monitoring is performed, affected employees or their designated representatives may observe monitoring of employee exposure to respirable crystalline silica.
- When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, UMD will provide the observer with protective clothing and equipment at no cost and shall ensure that the observer uses such clothing and equipment.
 - Note: The issuance and donning of PPE may require specialized training.

Performance Option

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.

* See ECP Matrix for activities previously monitored by ESSR.

Scheduled Monitoring Option

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

Within five working days after completing an exposure assessment, ESSR 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, ESSR 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 UMD can demonstrate 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 shall implement the use of respiratory protection

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.

ESSR 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.

B. 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.

*** Construction employers must designate a **Competent Person** to make frequent and regular inspections of job sites, materials, and equipment to ensure the ECP is implemented.

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, their designated representatives, and OSHA.

Below is a list of the workplace tasks and processes, which involve exposures to respirable crystalline silica.

UMD Employee Tasks with Silica Exposure

Construction Standard	
Group	Process
FM – Piped Services	Hammer drilling/ concrete coring
FM – Piped Services	Knockdown of brick and cinderblock walls
FM – Classroom Maintenance	Installation of desks/chairs – concrete drilling
FM – OSCR, Capital & Campus PM	Project Observation
FM – Structural Trades (Roofing, Concrete, Roadways, Floors, Masonry)	Project Observation
FM – Heavy Equipment	Mixing Mortar and Brick laying
FM – Heavy Equipment	Concrete work – demotion and cutting
FM – Landscape Services & Heavy Equipment	Rock hauling, crushing
FM – Renovation Services	Anchoring walls into concrete/sheetrock
FM – Renovation Services	Hammer drilling/ concrete coring
FM – Renovation Services	Drywall/sheetrock installation
FM/DRF – Floor Shop	Floor leveling
FM – Misc. shops (Fleet and Sign)	Sandblasting (including evaluation of booths)
FM – Painters	Drywall sanding
DRF – PM	Project Observation
DRF – Maintenance	Countertops Surfacing
CSPAC	Sets
Stamp Student Union – Arts and Learning	Pottery Studio
Art Department	Foundry
Art Department	Molding and Casting
Art Department	Sandblasting (including evaluation of booths)
DOTS – Fleet Shop	Sandblasting (including evaluation of booths)
DRF – Housekeeping	Bathroom cleaning – SparCreme®

General Industry Standard	
Group	Process
Stamp Student Union – Arts and Learning	Pottery Studio
Art Department	Foundry
Art Department	Molding and Casting
Art Department	Sandblasting (including evaluation of booths)
DOTS – Fleet Shop	Sandblasting (including evaluation of booths)
DRF – Housekeeping	Bathroom cleaning – SparCreme®

UMD Exposure Control Plan

In accordance with the OSHA requirements, the following table lists the elements included in UMD's ECP -- activities, descriptions, engineering controls, work practices and respiratory protection -- used to limit employee exposure to respirable crystalline silica for each task.

Task/risk management matrix (relating to Silica dust) use Table 1 for codes, separate with a comma (,)							
#	Task	Indoors	Controls		PPE	Supplies / Equipment	8 Hour TWA
		Outdoors	Engineering	Admin/Work Practice			
1	Project Observation	I/O	N/A	1	N/A	N/A	<8.3 µg/m ³
2	Drywall Sanding	I	N/A	1	2	12	<2.5 µg/m ³
3	Cleaning (SparCreme)	I	N/A	N/A	2	12	<13 µg/m ³
4	Sidewalk Cutting	O	9	1, 3	2	7	<0.33 µg/m ³
5							
6							
7							
8							
9							
10							
11							
12							
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19							
20							

TABLE 1 (Codes for task/risk management matrix)

Engineering Controls		Admin/Work Practice Controls		PPE		Supplies/Equipment	
1	Exhaust Fan	1	Signage	1	1/2 Face Neg. Press. Resp.	1	Hammer/Impact Attachments
2	Local Exhaust Ventilation	2	After Hours Work	2	N 95 Respirator	2	Jackhammer
3	Partial Enclosure	3	Scheduling	3	P 100 HEPA Filter	3	Handheld Chipping Gun
4	Full Enclosure	4	Wetting	4	P 100 Combo Filter	4	Bush Hammer
5	HEPA Vacuum Tool Attachment	5		5		5	Drills
6	Barriers	6		6		6	Partner Saw
7	Negative Pressure Enclosure	7		7		7	Walk Behind Saw
8	Dust Collection System	8		8		8	Grinder
9	Integrated Water Suppression	9		9		9	Mixer
10		10		10		10	Soil Pick
11		11		11		11	Vibratory Plate
12	Other	12	Other	12	Other	12	Other

C. 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 shall be used.
- Compressed air cannot be used to clean clothing or surfaces

D. Respiratory Protection Program

If Silica dust cannot be controlled, employees must be enrolled in the UMD Respiratory Protection Program. Details on the requirements of this program can be found at the following link:

<https://essr.umd.edu/sites/essr.umd.edu/files/files/documents/resp.pdf>

E. 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 ESSR Hazardous 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 to be used
- An explanation of the OSHA standard
- The purpose and description of the medical surveillance program

F. 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). Specific details regarding medical surveillance is included in Appendix B.

Summary of medical surveillance requirements

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

- 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 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

VI. CONSTRUCTION STANDARD TABLE 1

When possible and applicable, UMD will conduct activities with potential Silica exposure to be consistent with OSHA’s Construction Standard Table 1.

Supervisors will ensure each employee under their supervision and engaged in a task identified on OSHA’s Construction Standard Table 1 have fully and properly implemented the engineering controls, work practices, and respiratory protection specified for the task on Table 1 (unless ESSR has assessed and limited the exposure of the employee to Respirable crystalline silica in accordance with the Alternative Exposure Control Methods Section of this program).

The task(s) that could be performed by UMD employees identified on OSHA’s Construction Standard Table 1 is/are:

**Table 1: Specified Exposure Control Methods
When Working With Materials Containing Crystalline Silica**

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
1	Stationary masonry saws	<ul style="list-style-type: none"> 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
2a	Handheld power saws (any blade diameter) when used outdoors	<ul style="list-style-type: none"> 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	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask
2b	Handheld power saws (any blade diameter) when used indoors or in an enclosed area	<ul style="list-style-type: none"> 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. 	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask
3	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"> Use saw equipped with commercially available dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency. 	None	None

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
4a	Walk-behind saws when used outdoors	<ul style="list-style-type: none"> 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
4b	Walk-behind saws when used indoors or in an enclosed area	<ul style="list-style-type: none"> 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. 	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask
5	Drivable saws for tasks performed outdoors only	<ul style="list-style-type: none"> 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
6	Rig-mounted core saws or drills	<ul style="list-style-type: none"> 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
7	Handheld and stand-mounted drills (including impact and rotary hammer drills)	<ul style="list-style-type: none"> Use drill equipped with commercially available shroud or cowling with dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes. 	None	None
8	Dowel drilling rigs for concrete for tasks performed outdoors only	<ul style="list-style-type: none"> 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. 	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask
9a	Vehicle-mounted drilling rigs for rock and concrete	<ul style="list-style-type: none"> Use dust collection system with close capture hood or shroud around drill bit with 	None	None

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
		a low-flow water spray to wet the dust at the discharge point from the dust collector.		
9b	Vehicle-mounted drilling rigs for rock and concrete	<ul style="list-style-type: none"> Operate from within an enclosed cab and use water for dust suppression on drill bit. 	None	None
10a	Jackhammers and handheld powered chipping tools when used outdoors	<ul style="list-style-type: none"> Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact. 	None	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask
10b	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	<ul style="list-style-type: none"> Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact. 	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask
10c	Jackhammers and handheld powered chipping tools when used outdoors	<ul style="list-style-type: none"> 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 airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. 	None	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask
10d	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	<ul style="list-style-type: none"> 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 airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. 	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask
11	Handheld grinders for mortar removal (i.e., tuckpointing)	<ul style="list-style-type: none"> 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 	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask	Powered Air-Purifying Respirator (PAPR) with P100 Filters

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
		inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.		
12a	Handheld grinders for uses other than mortar removal for tasks performed outdoors only	<ul style="list-style-type: none"> • 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. 	None	None
12b	Handheld grinders for uses other than mortar removal when used outdoors	<ul style="list-style-type: none"> • 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. 	None	None
12c	Handheld grinders for uses other than mortar removal when used indoors or in an enclosed area	<ul style="list-style-type: none"> • 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. 	None	N95 (or Greater Efficiency) Filtering Face-Piece or Half-Mask
13a	Walk-behind milling machines and floor grinders	<ul style="list-style-type: none"> • 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. 	None	None
13b	Walk-behind milling machines and floor grinders	<ul style="list-style-type: none"> • 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 airflow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. 	None	None

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
		<ul style="list-style-type: none"> When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes. 		
14	Small drivable milling machines (less than half-lane)	<ul style="list-style-type: none"> 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
15a	Large drivable milling machines (half-lane and larger) for cuts of any depth on asphalt only	<ul style="list-style-type: 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. 	None	None
15b	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"> 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. 	None	None
15c	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"> 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
16	Crushing machines	<ul style="list-style-type: none"> 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
17a	Heavy equipment and utility vehicles used to abrade or fracture Silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities	<ul style="list-style-type: none"> Operate equipment from within an enclosed cab. 	None	None

Construction Task or Equipment Operation		Engineering and Work Practice Control Methods	Required Respiratory Protection	
			≤ 4 hours/shift	>4 hours/shift
	involving Silica-containing materials			
17b	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"> 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
18a	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"> Apply water and/or dust suppressants as necessary to minimize dust emissions. 	None	None
18b	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"> When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab. 	None	None

When implementing the control measures specified in Table 1, UMD shall:

- For tasks performed indoors or in enclosed areas, provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;
- For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;
- For measures implemented that include an enclosed cab or booth, ensure 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); and
 - Has heating and cooling capabilities.
- 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.

VII. Program Evaluation

This program will be reviewed and evaluated on an annual basis by ESSR unless changes to operations, the OSHA Respirable Crystalline Silica Construction Standard (29 CFR 1926.1153), or another applicable OSHA Standards require an immediate re-validation of this program.

VIII. Appendices

APPENDIX A – Site / Job Specific Silica Written Exposure Control Plan (ECP) template

APPENDIX B – University Health Center – Silica Medical Surveillance Program.

Appendix A
Site / Job Specific
Silica Exposure Control Plan

Dept. / Unit: _____ **Date:** _____

Person Completing the Plan / Title: _____

Competent Person: _____

Job Site / Location: _____

Description of Task: _____

(Routine task, new task, Indoors/outdoors, task found on Table 1.)

- 1910.1053 General Industry (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 = air monitoring is required. Engineering controls must be used at all times.**

(Wet methods, continuous water feed, local exhaust ventilation w/ HEPA filters, commercially available shrouds, commercial dust collection system, cyclone pre-separator/filter cleaning system, surfactant used, and ventilation ≥ 25 cfm/inch of wheel diameter, enclosed cab w/ fresh climate controlled air to operator, employees outside of cabs applying water/dust suppressants, equipment maintained to minimize dust emissions.)

Work Practices: _____

(Maintain equipment functionality – cleaned/spare filters, hoses to start; good connections; hoses with no holes, kinks, permanent bends, crushed; power source available; water source available, ensure ventilation is ≥ 25 cfm/inch of wheel diameter; water/exhaust ventilation lines safe from damage; shrouds/cowls fit correctly and not damaged; follow Manufacturer’s instruction for filter cleaning/change out.)

Respiratory Protection: _____

(e.g. Use respirator with APF = 10 the entire time the task is being performed – See Table 1)

See Part 451 – Respiratory Protection rule (1910.134) for information on selection, training and fit testing requirements, and proper use instruction for respirators (i.e., no facial hair interfering with the respirator-sealing surface).

Housekeeping: _____

(Dust containing Silica on work surfaces/equipment must be cleaned up using wet methods, HEPA equipped vacuum, No use of compressed air, **or dry sweeping** for removing dust and debris containing Silica, dispose of used vacuum bags in a closed sealed container).

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

(Signage, barricades, enclosures, spotters, work when area is cleared of other contractors to reduce risk of exposure.)

Objective data use (Optional) – **Yes** or **NO**

Data Source: _____

Does the data conditions from the data source exactly match the work conditions? **Yes** or **No**
(Same conditions, equipment, process, controls, material Silica percentage, environmental.)

***** Review this plan with all involved employees.
Keep a copy of this plan at the jobsite.
Provide this plan of action to the General Contractor.
Review and update annually.**

Additional Notes: _____

Appendix B

Silica Medical Surveillance Program Questionnaire Information

The following information shall be provided to the PLHCP:

- A description of the former, current, and anticipated levels of 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.

The PLHCP shall explain the results of the medical examination and provide each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:

- A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica, and any medical conditions that require further evaluation or treatment.
- Any recommended limitations on the employee's use of respirators
- Any recommended limitations on the employee's exposure to respirable crystalline silica.
- A statement that the employee should be examined by a specialist if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

The employer shall obtain a written medical opinion from the PLHCP within 30 days of the medical examination, and shall contain the following:

- The date of the examination
- A statement that the examination has met the requirements of this section.
- Any recommended limitations on the employee's use of respirators.
- If the employee provides written authorization, the written opinion shall also contain either or both of the following:
 - Any recommended limitations on the employee's exposure to respirable crystalline silica.
 - A statement that the employee should be examined by a specialist if the X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if a referral to a specialist is otherwise deemed appropriate by the PLHCP.

Additional Examinations

- If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, the employer shall make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.
- The employer shall ensure that the specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination. The written report shall meet the requirements stated above.
- The employer shall obtain a written opinion from the specialist within 30 days of the medical examination. The written opinion shall meet the requirements stated above.