

ADVANCED EXCAVATING SPECIALISTS, LLC (AES)
FIVE RIVERS CONSTRUCTION (FRC)
Crystalline Silica Exposure Control for Construction

PURPOSE

The purpose of an exposure control manual is to set out our approach to protecting workers from harmful exposure to respirable crystalline silica dust in accordance with the respirable crystalline silica standard, 29 CFR 1926.1153 for construction.

A combination of control measures will be required to achieve this objective. We commit to being diligent in our efforts to select the most effective control technologies available, and to ensure that the best practices, as described in this manual, are followed at our worksites.

Additional information may be found at <https://www.osha.gov/Publications/OSHA3681.pdf>

DEFINITIONS

Action level: a concentration of airborne respirable crystalline silica of 25 µg/m³, calculated as an 8-hour TWA.

Assistant Secretary: The Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Director: The Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Competent Person: An individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them. The competent person must have the knowledge and ability necessary to fulfill the responsibilities set forth in paragraph (g) of this section.

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

High-Efficiency Particulate Air [HEPA] Filter: A filter that is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter.

Objective Data: 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 ADVANCED EXCAVATING SPECIALISTS's current operations.

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Physician or other licensed health care professional [PLHCP]: 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 paragraph (h) of this section.

Respirable Crystalline Silica: 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: An American Board-Certified Specialist in Pulmonary Disease or an American Board-Certified Specialist in Occupational Medicine.

SCOPE

This plan applies to all occupational exposures to respirable crystalline silica in construction work, except where employee exposure will remain below 25 micrograms per cubic meter of air (25 µg/m³) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

KEY RESPONSIBILITIES

Due to the significant risk posed by respirable silica, it is critical that all personnel involved in operations that could potentially create silica dust take specific action to ensure that, as much as possible, a hazard is not created.

Advanced Excavating Specialists and Five Rivers Construction are responsible for:

- Substitution of less hazardous products for those that contain crystalline silica is required.
- Ensuring that the materials (e.g., tools, equipment, personal protective equipment) and other resources (i.e., worker training materials) required to fully implement and maintain this exposure control manual are readily available where and when they are required.
- Providing a job hazard analysis for each project, which outlines in detail the work methods and practices that will be followed on each site. Considerations will include:
 - Availability and delivery of all required tools/equipment
 - Scope and nature of grinding work to be conducted
 - Control methods to be used and level of respiratory protection required
 - Coordinate completion of a Respirator Program via Lower Columbia Occupational Health when Respirators are required. See Advanced Excavating Specialists and Five Rivers Construction “Respirator Program” for more details.
- Initiating sampling of worker exposure to respirable crystalline silica in accordance with this plan.
- Ensuring medical surveillance occurs as required.
- Ensuring that all required tools, equipment, and personal protective equipment are readily available and used as required by the ECP and Table 1.
- Ensuring supervisors and workers are educated and trained to an acceptable level of competency.

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- Maintaining records of training, fit-test results, crew talks, and inspections (equipment, PPE, work methods/practices).
- Coordinating the work with the prime contractor and other employers to ensure a safe work environment.

The supervisor (foreman and lead hand) is responsible for:

- Obtaining a copy of the Job Hazard Analysis (included in each Site Specific Safety Plan) and Respirator Program (when required) from Advanced Excavating Specialists or Five Rivers Construction, and making it available at the worksite
- Selecting, implementing, and documenting the appropriate site-specific control measures
- Providing adequate instruction to workers on the hazards of working with silica-containing materials (e.g., concrete) and on the precautions specified in the job-specific plan covering hazards at the location.
- Ensuring that workers are using the proper respirators and have been fit-tested, and that the results are recorded.
- Directing the work in a manner that ensures the risk to workers is minimized and adequately controlled.
- Communicating with the prime contractor and other sub-contractors to ensure a safe work environment.

The worker is responsible for:

- Knowing the hazards of silica dust exposure.
- Using the assigned protective equipment in an effective and safe manner.
- Setting up the operation in accordance with the site-specific plan.
- Following established work procedures as directed by the supervisor.
- Reporting any unsafe conditions or acts to the supervisor.
- Knowing how and when to report exposure incidents.

SILICA PROPERTIES

Silica is the second most common mineral on earth and makes up nearly all of what we call “sand” and “rock.” Silica exists in many forms—one of these, “crystalline” silica (including quartz), is the most abundant and poses the greatest concern for human health. Some common materials that contain silica include:

- Rock and sand
- Topsoil and fill
- Concrete, cement, and mortar
- Masonry, brick, and tile
- Granite, sandstone, and slate
- Asphalt (containing rock and stone)
- Fibrous-cement board containing silica

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Silica is a primary component of many common construction materials, and silica-containing dust can be generated during many construction activities, including:

- Abrasive blasting (e.g., of concrete structures)
- Jackhammering, chipping, or drilling rock or concrete
- Cutting brick or tiles
- Sawing or grinding concrete
- Tuck point grinding
- Road construction
- Loading, hauling, and dumping gravel
- Demolition of structures containing concrete
- Sweeping concrete dust

Unprotected workers performing these activities, or working in the vicinity, can be exposed to harmful levels of airborne silica. Workers in other industries can also be exposed to silica, for example in the manufacture of toothpaste or pottery, or when loading coal (which can contain quartz) into the hold of a ship.

Health Hazards

Exposure to silica has been shown to cause silicosis, lung cancer, pulmonary tuberculosis, and other airway diseases. Crystalline silica dust can cause a disabling, sometimes fatal disease called silicosis. The fine particles are deposited in the lungs, causing thickening, and scarring of the lung tissue. The scar tissue restricts the lungs' ability to extract oxygen from the air. This damage is permanent, but symptoms of the disease may not appear for many years.

A worker may develop any of three types of silicosis, depending on the concentrations of silica dust and the duration of exposure:

- Chronic silicosis—develops after 10 or more years of exposure to crystalline silica at relatively low concentrations.
- Accelerated silicosis—develops 5 to 10 years after initial exposure to crystalline silica at high concentrations.
- Acute silicosis—develops within a few weeks, or 4 to 5 years, after exposure to very high concentrations of crystalline silica.

Initially, workers with silicosis may have no symptoms; however, as the disease progresses, a worker may experience:

- Shortness of breath
- Severe cough
- Weakness

These symptoms can worsen over time and lead to death. Exposure to silica has also been linked to other diseases, including bronchitis, tuberculosis, and lung cancer.

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SPECIFIC EXPOSURE CONTROL METHODS

For each employee engaged in a task identified on Table 1 (see end of this document) Advanced Excavating Specialists and Five Rivers Construction shall fully and properly implement the engineering controls, work practices, and respiratory protection specified for the task on Table 1, unless Advanced Excavating Specialists and Five Rivers Construction assesses and limits the exposure of the employee to respirable crystalline silica.

When implementing the control measures specified in Table 1 (see end of this document), Advanced Excavating Specialists and Five Rivers Construction 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.
 - Has heating and cooling capabilities.

Where an employee performs more than one task on Table 1 during 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.

Alternative Exposure Control Methods

For tasks not listed in Table 1, or where Advanced Excavating Specialists and Five Rivers Construction does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:

- Permissible exposure limit (PEL)
 - Advanced Excavating Specialists and Five Rivers Construction 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.
- Exposure Assessment
 - General - Advanced Excavating Specialists and Five Rivers Construction shall assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level.
 - Performance Option - Advanced Excavating Specialists and Five Rivers Construction shall assess the 8-hour TWA exposure for each employee on the basis of any combination of air

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- monitoring data or objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.
- Scheduled Monitoring Option
 - Advanced Excavating Specialists and Five Rivers Construction shall perform initial monitoring to assess the 8-hour TWA exposure for each employee 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, in each work area. Where several employees perform the same tasks on the same shift and in the same work area, Advanced Excavating Specialists and Five Rivers Construction may sample a representative fraction of these employees in order to meet this requirement. In representative sampling, Advanced Excavating Specialists and Five Rivers Construction shall sample the employee(s) who are expected to have the highest exposure to respirable crystalline silica.
 - If initial monitoring indicates that employee exposures are below the action level, Advanced Excavating Specialists and Five Rivers Construction may discontinue monitoring for those employees whose exposures are represented by such monitoring.
 - Where the most recent exposure monitoring indicates that employee exposures are at or above the action level but at or below the PEL, Advanced Excavating Specialists and Five Rivers Construction shall repeat such monitoring within six months of the most recent monitoring.
 - Where the most recent exposure monitoring indicates that employee exposures are above the PEL, Advanced Excavating Specialists and Five Rivers Construction shall repeat such monitoring within three months of the most recent monitoring.
 - Where the most recent (non-initial) exposure monitoring indicates that employee exposures are below the action level, Advanced Excavating Specialists and Five Rivers Construction shall repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the action level, at which time Advanced Excavating Specialists and Five Rivers Construction may discontinue monitoring for those employees whose exposures are represented by such monitoring.
 - Reassessment of exposures.
 - Advanced Excavating Specialists and Five Rivers Construction shall reassess exposures 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 when Advanced Excavating Specialists and Five Rivers Construction have any reason to believe that new or additional exposures at or above the action level have occurred.
 - Methods of sample analysis.
 - Advanced Excavating Specialists and Five Rivers Construction shall ensure that all samples taken to satisfy the monitoring requirements are evaluated by a laboratory that analyzes air samples for respirable crystalline silica in accordance with the procedures specified in Methods of Sample Analysis in this document.
 - Employee notification of assessment results.
 - Within five working days after completing an exposure Advanced Excavating Specialists and Five Rivers Construction shall individually notify each affected employee in writing of the results of that assessment or post the results in an appropriate location accessible to all affected employees.

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- Whenever an exposure assessment indicates that employee exposure is above the PEL, Advanced Excavating Specialists and Five Rivers Construction shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.
- Observation of Monitoring
 - Where air monitoring is performed to comply with the requirements of this section, Advanced Excavating Specialists and Five Rivers Construction shall provide affected employees or their designated representatives an opportunity to observe any 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, Advanced Excavating Specialists and Five Rivers Construction shall provide the observer with protective clothing and equipment at no cost and shall ensure that the observer uses such clothing and equipment.
- Methods of compliance
 - Engineering and work practice controls. Advanced Excavating Specialists and Five Rivers Construction shall use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless Advanced Excavating Specialists and Five Rivers Construction 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, Advanced Excavating Specialists and Five Rivers Construction shall nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them with the use of respiratory protection.
 - Abrasive Blasting – Advanced Excavating Specialists and Five Rivers Construction shall comply with other OSHA standards, when applicable, such as 29 CFR 1926.57 (ventilation), where abrasive blasting is conducted using crystalline silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.

Respiratory Protection

All medical evaluations and surveillance, fit testing, respirator maintenance, use and selection will be in accordance with the companies established “Respirator Program”.

Where respiratory protection is required by this section, Advanced Excavating Specialists and Five Rivers Construction must provide each employee with an appropriate respirator that complies with the requirements of Advanced Excavating Specialists and Five Rivers Construction “respirator Program” and 29 CFR 1910.134. Respiratory protection is required:

- Where specified by Table (see end of document)
- For tasks not listed in Table 1, or where Advanced Excavating Specialists and Five Rivers Construction does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:
 - Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls.
 - Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering, and work practice controls are not feasible.

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- During tasks for which Advanced Excavating Specialists and Five Rivers Construction has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL.
- Respiratory Protection Program. Where respirator use is required by this section, Advanced Excavating Specialists and Five Rivers Construction shall institute a respiratory protection program in accordance with 29 CFR 1910.134 and the company "Respirator Program".
- Specified Exposure Control Methods - For the tasks listed in Table 1, if Advanced Excavating Specialists and Five Rivers Construction fully and properly implements the engineering controls, work practices, and respiratory protection described in Table 1, Advanced Excavating Specialists and Five Rivers Construction shall be considered to be in compliance with the requirements for selection of respirators in 29 CFR 1910.134(d)(1)(iii) and (d)(3) with regard to exposure to respirable crystalline silica.

HOUSEKEEPING

Advanced Excavating Specialists and Five Rivers Construction shall not allow dry sweeping or dry brushing where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.

Advanced Excavating Specialists and Five Rivers Construction shall not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:

- The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or
- No alternative method is feasible.

TRAINING

Advanced Excavating Specialists and Five Rivers Construction shall ensure that each employee covered by this section can demonstrate knowledge and understanding of at least the following:

- The health hazards associated with exposure to respirable crystalline silica.
- Specific tasks in the workplace that could result in exposure to respirable crystalline silica.
- Specific measures Advanced Excavating Specialists and Five Rivers Construction have implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used.
- The contents of this document.
- The identity of the competent person designated.
- Where employees can find the Site Specific Safety Plan with identified job hazards and the job specific Respirator Program when applicable.

Advanced Excavating Specialists and Five Rivers Construction shall make a copy of this section readily available without cost to each employee covered by this section.

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RECORD KEEPING

Air Monitoring Data

Advanced Excavating Specialists and Five Rivers Construction shall make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica.

This record shall include at least the following information:

- The date of measurement for each sample taken.
- The task monitored.
- Sampling and analytical methods used.
- Number, duration, and results of samples taken.
- Identity of the laboratory that performed the analysis.
- Type of personal protective equipment, such as respirators, worn by the employees monitored.
- Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

Advanced Excavating Specialists and Five Rivers Construction shall ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

Objective Data

Advanced Excavating Specialists and Five Rivers Construction shall make and maintain an accurate record of all objective data relied upon and this record shall include at least the following information:

- The crystalline silica-containing material in question.
- The source of the objective data.
- The testing protocol and results of testing.
- A description of the process, task, or activity on which the objective data were based; and
- Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

Advanced Excavating Specialists and Five Rivers Construction shall ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020.

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TABLE 1—SPECIFIED EXPOSURE CONTROL METHODS WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
Stationary masonry 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	None	
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
Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	<u>For tasks performed outdoors only</u> 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 air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency	None	
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	
	When used indoors or in an enclosed area	APF 10	APF 10
Drivable saws	<u>For tasks performed outdoors only</u> Use saw equipped with integrated water delivery system that continuously feeds water to the blade	None	
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
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	

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TABLE 1 CONTINUED

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
Handheld and stand-mounted drills (including impact and rotary hammer drills)	<p>Use drill equipped with commercially available shroud or cowling with dust collection system</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions</p> <p>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism</p> <p>Use a HEPA-filtered vacuum when cleaning holes</p>	None	
Dowel drilling rigs for concrete	<p><u>For tasks performed outdoors only</u></p> <p>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</p> <p>Use a HEPA-filtered vacuum when cleaning holes</p>	APF 10	APF 10
Vehicle-mounted drilling rigs for rock and concrete	<p>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</p> <p>OR</p> <p>Operate from within an enclosed cab and use water for dust suppression on drill bit</p>	None	
Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:		
	When used outdoors	None	APF 10
	When used indoors or in an enclosed area	APF 10	APF 10
	OR		
	Use tool equipped with commercially available shroud and dust collection system <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions</p> <p>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism:</p>		
	When used outdoors	None	APF 10
When used indoors or in an enclosed area	APF 10	APF 10	

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TABLE 1 CONTINUED

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
Handheld grinders for mortar removal (<i>i.e.</i> , tuckpointing)	<p>Use grinder equipped with commercially available shroud and dust collection system</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions</p> <p>Dust collector must provide 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</p>	APF 10	APF 25
Handheld grinders for uses other than mortar removal	<p style="text-align: center;"><u>For tasks performed outdoors only</u></p> <p>Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions</p> <p style="text-align: center;">OR</p> <p>Use grinder equipped with commercially available shroud and dust collection system</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions</p> <p>Dust collector must provide 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:</p>	None	
	When used outdoors	None	None
	When used indoors or in an enclosed area	None	APF 10

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TABLE 1 CONTINUED

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
Walk-behind milling machines and floor grinders	<p>Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions</p> <p style="text-align: center;">OR</p> <p>Use machine equipped with dust collection system recommended by the manufacturer.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions</p> <p>Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism</p> <p>When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes</p>	None	
Small drivable milling machines (less than half-lane)	<p>Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant</p> <p>Operate and maintain machine to minimize dust emissions</p>	None	
Large drivable milling machines (half-lane and larger)	<p style="text-align: center;"><u>For cuts of any depth on asphalt only:</u></p> <p>Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust</p> <p>Operate and maintain machine to minimize dust emissions</p> <p>For cuts of four inches in depth or less on any substrate:</p> <p>Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust</p> <p>Operate and maintain machine to minimize dust emissions</p> <p style="text-align: center;">OR</p> <p>Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant</p> <p>Operate and maintain machine to minimize dust emissions</p>	None	

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TABLE 1 CONTINUED

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
Crushing machines	<p>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)</p> <p>Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions</p> <p>Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote-control station</p>	None	
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	<p>Operate equipment from within an enclosed cab</p> <p>When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions</p>	None	
(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: Demolishing, abrading, or fracturing silica-containing materials	<p>Apply water and/or dust suppressants as necessary to minimize dust emissions</p> <p>OR</p>	None	