Training Record

LOCATION NAME	PHYSICAL ADDRESS	NEARTEST CITY	STATE	ZIP

	PRINTED NAME (include company name if subcontractor) **NOMBRE EN LETRA IMPRENTA** (si es subcontratista, incluya el nombre de la compañía)	*Signature / Firma*
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use p.2 for additional participants

Check the following to indicate completion and identify any other activities or resources used or referenced.

- ☐ *Communicated the contents of this program and any applicable regulations, and where and how to access both.*
- ☐ *Administered the training quiz (attached if completed individually).*
- ☐ *Communicated the contents of this program and the applicable regulations and where and how to access both.*
- ☐ *Reviewed the SDS on crystalline silica; particularly sections 2, 4, 8, and 11.*
- ☐ *Identified the company's designated competent person(s) for the exposure control plan.*
- ☐ *Explained the company's exposure control plan (ECP), including the exposure identification and control charts.*
- ☐ *Discussed the participants' activities that create an exposure to silica and verified inclusion in the ECP.*
- ☐ *Reviewed the prescribed controls in the ECP and verified consistent and effective implementation.*
- ☐ *Reviewed the purpose and a description of the medical surveillance program.*
- ☐

SUPERVISOR/FACILITATOR'S NAME *Signature* **DATE**

	PRINTED NAME (include company name if subcontractor) **NOMBRE EN LETRA IMPRENTA** (si es subcontratista, incluya el nombre de la compañía)	*Signature / Firma*
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The term silica is often used interchangeably with the terms silicates, crystalline silica, and silica quartz. Silica in quartz form makes up many common rock types, such as basalt, granite, schist, gneiss, and sandstone. Sand and certain types of soil are composed of large volumes of granular crystalline silica.

Whatever its form, silica can and does present a health hazard for workers in many industries. Mining and drilling processes generate silica hazards during excavating, quarrying, well-digging, hydraulic fracturing, etc. Silica is in the aggregate materials used in mixing and manufacturing operations for asphalt, ready-mix concrete, brick/block production, precast concrete plants, and pottery, glass, and tile manufacturing. Foundries use sand in metal-casting, and mills of all types that use heat at extreme temperatures rely on silica-containing refractories for process insulation.

In construction, silica hazards begin with excavation and continue with the cutting, drilling, shaping and finishing of a wide variety of building materials, such as concrete, masonry, glass and tile. Silica is also found in abrasive media for grinding, sanding and blasting. The silica levels can increase significantly during tear-out and demolition work.

The primary means by which silica creates a health hazard is through inhalation. When the air that workers breathe contains respirable silica particulates, or dusts, suspended in a dense enough concentration, the particulates can penetrate deep into the lungs and, over time, cause disabling, irreversible, and sometimes fatal lung diseases. These are not always symptomatic in the early stages but, as they progress, symptoms may include shortness of breath, fatigue, loss of appetite, chest pain, dry and nonproductive cough, and fever.

HEALTH EFFECTS OF OVER-EXPOSURE TO SILICA

Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute.

Chronic or Ordinary Silicosis is the most common form of silicosis, and can occur after many years (10 to 20 or more) of prolonged repeated inhalation of relatively low levels of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis. Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function or disability. However, it may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF).

- Complicated silicosis symptoms (PMF), if present, are shortness of breath and cough.
- PMF may be associated with decreased lung function and may be disabling.
- Advanced PMF can result in heart disease secondary to the lung disease (cor pumonale).
- Advanced PMF may lead to death.

Accelerated Silicosis can occur with prolonged repeated inhalation of high concentrations of respirable crystalline silica over a relatively short period. The lung lesions can appear within five (5) years of initial exposure. Progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that lung lesions appear earlier and progression is more rapid.

Acute Silicosis can occur after the repeated inhalation of very high concentrations of respirable crystalline silica over a short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough, weakness and weight loss. Acute silicosis is fatal.

Lung Cancer

The International Agency for Research on Cancer (IARC) and the US Department of Health and Human Services National Toxicology Program (NTP) have concluded that respirable crystalline silica is a carcinogen.

Autoimmune Diseases

Several studies have reported excess cases of several autoimmune disorders -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis -- among silica-exposed workers.

Tuberculosis

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to tuberculosis bacteria. Individuals with chronic silicosis have a three-fold higher risk of contracting tuberculosis than similar individuals without silicosis.

Kidney Disease

Several studies have reported excess cases of kidney diseases, including end stage renal disease, among silica-exposed workers.

Non-Malignant Respiratory Diseases

There are studies (NIOSH, etc.) that disclose an association between dusts found in various mining occupations and non-malignant respiratory diseases, particularly among smokers, such as chronic bronchitis, emphysema and small airways disease. It is unclear whether the observed associations exist only with underlying silicosis, only among smokers, or result from exposure to mineral dusts generally (independent of the presence or absence of crystalline silica, or the level of crystalline silica in the dust).

EXPOSURE CONTROL PLAN

The exposure to respirable crystalline silica must be assessed for all employees where it could be expected, under any foreseeable conditions, to be above the action level specified in the regulation, which is 25 micrograms per cubic meter of air (25 $\mu g/m^3$) as an 8-hour time-weighted average (TWA).

Basic Precautions

Controlling the silica exposure begins with controlling dry dust, which becomes airborne when it is disturbed during mixing, grinding, crushing, cutting, drilling, chipping, blasting, and dumping/disposing. Even driving vehicles and equipment can create harmful clouds of silica dust. Efforts should be made to:

- Substitute non-silica-based material for silica-based material where feasible.
- Not eat, drink or smoke near crystalline silica dust.
- Wash hands and face before eating, drinking or smoking and leave the exposure area to do so.
- Use available engineering controls such as local exhaust ventilation, dust collection systems, and enclosures for blasting.
- Mist/spray dusty operations with water where feasible.
- Use direct connection wet methods for cutting, chipping, drilling, grinding, etc., where feasible.

Housekeeping

Housekeeping, which is normally an effective safety measure, may actually create or exacerbate the silica hazard if the sweeping/vacuuming/blowing/disposing activities involve sufficient quantities of dry dust.

Dry sweeping or dry brushing, where such activity could contribute to exposure to respirable crystalline silica, is prohibited unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.

Neither is compressed air permitted for use in cleaning clothes or surfaces where such activity could contribute to 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 if no alternative method is feasible.

Feasibility determinations are the responsibility of the supervisor, who must work with both the workers and the project managers to ensure the intent of this requirement is met.

Exposure Identification

Dust contains larger particles that are easy to see in a cloud, but there are also tiny, respirable-sized particles that are not always visible even when concentrated. Visible dust indicates a potential hazard, but the hazard could also be invisible. The determination depends on the activity and materials involved.

Regulatory Thresholds

In federal OSHA's silica standard (29 CFR 1926.1153 in Subpart Z), the ***permissible exposure limit (PEL)*** for respirable silica is set at fifty micrograms per cubic meter of air (***50µg/m³***) averaged over an 8-hour shift. The construction standard permits our company to either:

- implement the engineering controls, work practices, and respiratory protection specified for the tasks specified in Table 1 of the standard [1926.1153(c)(1)]; or
- assesses the exposure to respirable crystalline silica in accordance with the provisions of 1926.1153(d)(2), which set the ***action level*** at which certain procedures must be initiated at ***25µg/m³***.

Activities Performed That Involve Exposure to Respirable Silica

The activities that can create an over-exposure to silica, and the level of the exposure, must be documented in a manner that facilitates compliance methods, either as specified in 1926.1153 Table 1 (attached), or through discretionary methods that are demonstrated to reduce and maintain the exposure below the PEL. There are five (5) charts included in this program that are designed to facilitate this documentation process:

- **EXPOSURE IDENTIFICATION FROM TABLE 1 TASKS**
  This chart is intended to document the Table 1 tasks and equipment that could create an exposure to crystalline silica, with notes on the applicability of any of the 18 items (i – xviii) along with each item's parameters.
- **EXPOSURE ASSESSMENT FROM ALTERNATIVE METHODS – Performance Option for Each Employee**
  This chart is intended to document the sampling data for each exposed employee where the performance option is the chosen alternative method.
- **EXPOSURE ASSESSMENT FROM ALTERNATIVE METHODS – Scheduled Monitoring for Representative Sample**
  This chart is intended to document the periodic sampling data where scheduled monitoring of a representative sample is the chosen alternative method.
- **EXPOSURE CONTROL – Engineering Controls, Work Practices, Respiratory Protection**
  This chart is intended to document the exposure control method, either from Table 1 or per the alternative method determinations, for each activity that creates an overexposure to crystalline silica.
- **SITE ACCESS AND HOUSEKEEPING CONTROLS**
  This chart is intended to document the procedures and restrictions that will be used to minimize the number of workers with access to sites where silica exposure is being created and to reduce the exposure to silica during certain housekeeping activities.

Once completed, the charts will be included as an addendum to this program, along with the laboratory results from the monitoring or the objective data on the silica exposure, and all will be communicated to the affected employees per the requirements of 29 CFR 1926.1153.

Our company will review and evaluate the effectiveness of the written exposure control plan at least annually and update it as necessary. The plan will be readily available for examination and copying, upon request, to all employees covered by the standard, their designated representatives, and the Assistant Secretary and the Director.

A competent person, who is capable of identifying existing and predictable hazards related to crystalline silica hazards, and who has authorization to take prompt corrective measures to eliminate them, will be designated to make frequent and regular inspections of job sites, materials, and equipment in order to facilitate the effective implementation of the written exposure control plan.

Exposure Control

Table 1 Compliance

We will rely first on the Table 1 provisions that specify engineering controls, work practices, and respiratory protection for any of the eighteen (i – xviii) tasks/equipment within the specified parameters, which are itemized in our exposure identification documentation. When implementing the Table 1 control measures, our company will ensure the following:

1. For tasks performed indoors or in enclosed areas, we will provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;
2. For tasks performed using wet methods, we will apply water at flow rates sufficient to minimize release of visible dust;
3. For measures implemented that include an enclosed cab or booth, we will ensure that the enclosed cab or booth:
    - **a.** Is maintained as free as practicable from settled dust;
    - **b.** Has door seals and closing mechanisms that work properly;
    - **c.** Has gaskets and seals that are in good condition and working properly;
    - **d.** Is under positive pressure maintained through continuous delivery of fresh air;
    - **e.** 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
    - **f.** Has heating and cooling capabilities.

Where an employee performs more than one task on 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.

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29 CFR 1926.1153 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	Required respiratory protection and minimum assigned protection factor (APF) >4 hours/shift
(i) 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	None
(ii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:			
	When used outdoors	-	None	APF 10
	When used indoors or in an enclosed area	-	APF 10	APF 10
(iii) Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: 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	None
(iv) Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:			
	When used outdoors	-	None	None
	When used indoors or in an enclosed area	-	APF 10	APF 10

29 CFR 1926.1153 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	Required respiratory protection and minimum assigned protection factor (APF) >4 hours/shift
(v) Drivable saws	For tasks performed outdoors only: Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
(vi) Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism Use a HEPA-filtered vacuum when cleaning holes	None	None
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filtercleaning mechanism Use a HEPA-filtered vacuum when cleaning holes	APF 10	APF 10

29 CFR 1926.1153 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	Required respiratory protection and minimum assigned protection factor (APF) >4 hours/shift
(ix) Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector	None	None
	OR		
	Operate from within an enclosed cab and use water for dust suppression on drill bit	None	None
(x) Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:		
	When used outdoors -	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		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism:		
	When used outdoors -	None	APF 10
	When used indoors or in an enclosed area -	APF 10	APF 10

29 CFR 1926.1153 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	Required respiratory protection and minimum assigned protection factor (APF) >4 hours/shift
(xi) Handheld grinders for mortar removal (*i.e.*, tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide 25 cubic feet per minute (cfm) 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	APF 10	APF 25
(xii) Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions OR 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
	When used outdoors -	None	None
	When used indoors or in an enclosed area -	None	APF 10

29 CFR 1926.1153 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
(xiii) Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions OR Use machine equipped with dust collection system recommended by the manufacturer Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes	None	None
(xiv) Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant Operate and maintain machine to minimize dust emissions	None	None

29 CFR 1926.1153 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
(xv) Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust Operate and maintain machine to minimize dust emissions For cuts of four inches in depth or less on any substrate: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust Operate and maintain machine to minimize dust emissions OR Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant Operate and maintain machine to minimize dust emissions	None None None	None None None
(xvi) Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points) Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station	None	None

29 CFR 1926.1153 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
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (*e.g.*, hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab	None	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
(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: Demolishing, abrading, or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions OR	None	None
	When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab	None	None

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Alternative Exposure Control Methods

If a task or a particular type of equipment, or the way we perform the task or use the equipment, is not included in Table 1 (see exposure identification documentation), then we will employ alternative exposure control methods that ensure no employee is exposed to an airborne concentration of respirable crystalline silica in excess of ***50µg/m³***, calculated as an 8-hour TWA. The exposure assessment will be made using:

- The Performance Option for each exposed employee [1926.1153(d)(2)(ii)]; or
- The Scheduled Monitoring Option [1926.1153(d)(2)(iii)]

All samples taken to satisfy the monitoring requirements for either option will evaluated by a laboratory that analyzes air samples for respirable crystalline silica in accordance with the procedures in 1926.1153 Appendix A.

Within five working days after completing an exposure assessment, each affected employee will be individually notified in writing of the results of that assessment, or the results will be posted in an appropriate location accessible to all affected employees.

Whenever an exposure assessment indicates that employee exposure is above the PEL, the written notification will describe the corrective action being taken to reduce employee exposure to or below the PEL.

Affected employees or their designated representatives will have the opportunity to observe any monitoring of employee exposure to respirable crystalline silica. When the observation requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, the observer will be provided with protective clothing and equipment at no cost and its use will be mandatory.

Our company will use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless it can be demonstrated that such controls are infeasible.

Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, we will nonetheless use them to reduce employee exposure to the lowest feasible level and will supplement them with the use of respiratory protection that complies with the requirements of 1926.1153{e).

In the event that abrasive blasting creates a regulated exposure to silica (i.e. the use of crystalline silica-containing blasting agents, or where the blasting is conducted on substrates that contain crystalline silica) we will comply with other OSHA standards, when applicable, such as the ventilation requirements in 29 CFR 1926.57.

Engineering Control and Work Practice Considerations for Alternative Methods

We will use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless it can be demonstrated 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, we will nonetheless use them to reduce the exposure to the lowest feasible level and supplement them with the use of respiratory protection that complies with the applicable regulations.

Additionally, we will comply with applicable regulations that are related to abrasive blasting, including those that specify ventilation, where abrasive blasting is conducted using crystalline silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.

Water

Wet methods (i.e., methods involving the application of water) are often the easiest and most effective way to reduce potential silica exposures. Dust that is wet is less able to become or remain airborne. Water can be applied in different ways to suit the specific situation. For example:

- Wet mopping or spraying water, followed with a wet vacuum or squeegee, will collect dust and create less airborne dust than dry sweeping.
- The point where dust will be generated or has settled can be flooded by flushing surfaces with water or wet scrubbing.
- Particles can be removed from surfaces by water under pressure (pressure washing).

Water can be used as a dust suppressant during a variety of activities, including:

- Use of heavy construction vehicles on unpaved surfaces: A water truck can spray the site grounds.
- Blasting operations: A separate water hose can be strung next to the hose containing the blasting medium; the two materials can be sprayed simultaneously.

It is often most efficient to spray a material before it reaches a transfer point so that the dust has time to absorb the water before being disturbed. Increasing moisture content decreases the amount of dust generated.

A spray or mist can be an efficient way to distribute adequate amounts of water over a large area. For a small job, a portable garden sprayer with a hand pump may be adequate; a larger job might require a garden hose with a mister nozzle. On a demolition site, a fire hose can be used to apply water rapidly over a large area, but employees must be able to control both the spray nozzle and the water pressure or volume.

Application should start with a gentle spray or mist, thereby avoiding the disbursement of dry dust with a forceful stream of water. When washing large quantities of dust from a surface, increase the water force only after pre-wetting all the dust with a gentle spray.

Use the minimum amount of water needed to get the job done, particularly where runoff is a concern. For optimal results:

- Use nozzles and flow regulators to control water volume.
- Clean up water and slurry as soon as practical (using a wet/dry shop vacuum or squeegees and scoops). If allowed to dry, the dust contained in the slurry may create a silica exposure.
- Re-wet surfaces as often as necessary to maintain dust control.

Vacuum Methods

Vacuums offer a versatile option for collecting dry debris from smooth and uneven surfaces, cracks, expansion joints and irregular shapes. Wet/dry vacuums can also collect water, slurry and damp materials. Pneumatic vacuums may be used where electricity is not available. Vacuums do not produce the clouds of dust often generated during dry sweeping or blowing with compressed air, but they are not dust-free.
Vacuum cleaners with inadequate or damaged filters can increase employee silica dust exposures due to the agitating action of the vacuum and incomplete filtration of fine dust particles. Employers must choose vacuum filter media carefully.

Vacuums with self-cleaning features (backpulse) should be considered, but employees must be trained in vacuum operation. Vacuum bags must be handled carefully and a disposal receptacle should be nearby. Avoid overfilling vacuum canisters or bags. The extra weight makes bags difficult to handle and subject to tearing. Avoid shaking or jarring the vacuum. Follow the manufacturer's instructions for recommended handling. Avoid depositing or storing collected debris where it will be disturbed or run over and become a source of dust exposure for another employee.

Dumping or Pouring Materials

The farther objects fall when dropped, the more dust they will generate on impact. When dumping or pouring materials (for example, debris into a dumpster or raw materials into a mixer), minimize drop distances by releasing materials close to their destination level. Support the bag, bin, or barrow just above the top of the pile and slowly add materials onto the pile. When a long drop is unavoidable, use enclosed disposal chutes or slides. Use wheelbarrow ramps of appropriate height (not too tall for a small dump pile). Moisten the dumpster contents, floors and walls prior to adding any debris to reduce dust released upon impact. Spray the debris stream with water mist to help suppress dust.

Removing Debris from Slots or Uneven Surfaces

Use a vacuum instead of a blower. Use vacuum hose attachments sized for the situation. For example, remove tailings from handheld drill holes using a HEPA-filtered vacuum. Flush cracks with water instead of using compressed air.

Other Work Practices

Common work practices can help limit exposure to silica. Examples include:

- Clean up spills and waste before dust can spread.
- Wear a rubber apron to keep wet dust off of clothing. When it dries, it can become airborne.
- Whenever possible, work upwind of any dust sources. This can be as simple as working from the other side of the pile when shoveling debris.
- Keep roadways damp at sites where the surface includes high silica aggregate.
- Wet down silica-containing debris and rock spoil piles prior to removal or disturbance.

Respiratory Protection

Where respiratory protection is required, affected employees will be enrolled in a respiratory protection program as required in 29 CFR 1910.134. Respiratory protection is required:

1. Where specified by Table 1
2. For tasks not listed in Table 1, or where we do not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1
3. Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls
4. Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible; and
5. During tasks for which we have implemented all feasible engineering and work practice controls and such controls

For the tasks listed in Table 1, when we are able to fully and properly implement the engineering controls, work practices, and respiratory protection described therein, we will be considered to be in compliance with the applicable respiratory protection requirements of 1926.1153 with regard to respirable crystalline silica exposure as long as the applicable portions of 1910.134 are followed. Where respiratory protection is required, we will provide affected employees with an appropriate respirator that complies with the regulatory standards.

Medical Surveillance

Medical surveillance will be made available at no cost, and at a reasonable time and place, for each employee who will be required to use a respirator to avoid over-exposure to crystalline silica for 30 or more days per year.

All required medical examinations and procedures will be performed by a physician or other licensed health care professional [PLHCP], which 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 silica standard.

Initial Examination

An initial (baseline) medical examination will be made available within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements within the last three years. The examination will consist of:

- A 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 (e.g., shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history;
- A physical examination with special emphasis on the respiratory system;
- A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography

systems), interpreted and classified according to the International Labour Office (ILO) International Classification of Radiographs of Pneumoconioses by a NIOSH-certified B Reader;

- A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSHapproved spirometry course;
- Testing for latent tuberculosis infection; and
- Any other tests deemed appropriate by the PLHCP.

Periodic Examinations

Medical examinations that include the procedures described above will be made available at least every three years, or more frequently if recommended by the PLHCP.

Information provided to the PLHCP

Our company will verify that the PLHCP has a copy of this standard, and will provide the PLHCP with the following information:

- A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;
- The employee's 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; and
- Information from records of employment-related medical examinations previously provided to the employee and currently within the control of our company.

PLHCP's Written Medical Report for the Employee

Our company will ensure that the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report will 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; and;
- A statement that the employee should be examined by a specialist, pursuant to 1926.1153(h)(7), if the chest X-ray provided is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

PLHCP's Written Medical Opinion for the Employer

Our company will obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion may contain only the following:

- The date of the examination;
- A statement that the examination has met the requirements of this section; and
- Any recommended limitations on the employee's use of respirators.

If the employee provides written authorization, the written opinion must 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, pursuant to 1926.1153(h)(7), if the chest X-ray is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

Our company will ensure that each employee receives a copy of the written medical opinion within 30 days of each medical examination performed.

Additional Examinations

If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, our company will make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.

Our company will ensure that the examining specialist is provided with all of the information that the employer is obligated to provide to the PLHCP in accordance with paragraph 1926.1153(h)(4).

Our company will ensure that the specialist explains to the employee the results of the medical examination and provides each employee with a written medical report that meets the requirements of the standard within 30 days of the examination.

Our company will obtain a written opinion from the specialist that meets the requirements of the standard within 30 days of the medical examination.

Recordkeeping

There are five charts included in this section intended to assist with documentation of the exposure control plan and recordkeeping compliance. The first is for Table 1 itemization and compliance. The second and third are for the Alternative Method exposure assessment options. The fourth is for identifying the engineering controls, work practices and respiratory protection to be used with either the Table 1 option or the Alternative Methods options. The fifth is for identifying site access and housekeeping controls.

Supporting documentation from laboratory results and/or objective data sources should be attached to the completed charts.

Air Monitoring Data

Our company will make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica, as prescribed in the standard. This record will 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; and
- Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

All exposure records will be maintained and made available in accordance with 29 CFR 1910.1020.

Objective Data

Our company will make and maintain an accurate record of any Objective Data that we rely upon to comply with the standard. This record will 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 objective data were based.

All objective data records will be maintained and made available in accordance with 29 CFR 1910.1020.

Medical Surveillance

Our company will make and maintain an accurate record for each employee covered by the medical surveillance requirements of the standard. The record shall include the following information about the employee:

- Name and social security number;
- A copy of the PLHCPs' and specialists' written medical opinions; and
- A copy of the information provided to the PLHCPs and specialists.

All medical records will be maintained and made available in accordance with 29 CFR 1910.1020.

Communication of Respirable Crystalline Silica Hazards to Employees

Hazard Communication

Our company will include respirable crystalline silica hazards in the Hazard Communication of our HSE Program and will ensure that each employee has access to labels on containers of crystalline silica and safety data sheets, and is trained in accordance with 1926.1153(i)(2), as outlined below. We will ensure that at least the following hazards are addressed: cancer, lung effects, immune system effects, and kidney effects.

Employee Information and Training

Our training plan for this Silica program will 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 the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
- The contents of OSHA's Silica standard, a copy of which will be made readily available without cost to each employee covered by the standard;
- The identity of the company's designated competent person(s), who will be capable of identifying existing and predictable hazards related to crystalline silica hazards, and who will have authorization to take prompt corrective measures to eliminate them, and will be designated to make frequent and regular inspections of job sites, materials, and equipment in order to facilitate the effective implementation of the written exposure control plan.
- The purpose and a description of the medical surveillance program.

SUMMARY

1. Our company's silica exposures and the methods used to control the hazard and prevent employees from being over-exposed are included in this program and will be communicated to affected employees during training.

2. Airborne silica particulates can penetrate deep into the lungs and, over time, create irreversible and sometimes fatal lung diseases.

3. Silica can be found in aggregate materials used to make asphalt, ready-mix concrete, brick/block, mortars, precast concrete, pottery, glass, and tile.

4. Activities that can cause silica to become airborne include, but are not limited to, cutting, chipping, hammering, bag-breaking, mixing, and dumping.

5. Housekeeping, such as sweeping or dry brushing, or compressed air, can also create a silica hazard.

6. Workers may not be exposed to silica concentrations above the *permissible exposure limit (PEL)* which is fifty micrograms per cubic meter of air (*50µg/m^3*) averaged over an 8-hour.

7. The exposure control measures for some activities are identified in a table that is included in the safety regulations. Other control measures must be determined based on exposure measurements during the work that involves an exposure, and may include dust suppression by water, ventilation, and respiratory protection.

8. Wet methods are often the easiest and most effective. Vacuum methods may work, too, but care must be taken to choose the appropriate filtering media and exhaust location. Respirators used to reduce the exposure below the PEL may be worn only by those who are medically cleared to do so and who have been fit tested with the specific type of respirator to be used.

9. For certain exposures, employees will be enrolled in an exposure control plan that includes base-line and follow-up medical surveillance in order to monitor the potential health effects of the exposure.

10. Medical records related to silica exposure will be made available to affected employees according to the regulatory provisions in OSHA's standard on Toxic and Hazardous Substances (29 CFR 1910.1020 - requirements for access to employee exposure and medical records).

11. At no cost, this program and the federal OSHA regulation on silica is available to employees, along with the safety data sheet (SDS) on silica that is kept on file as part of the company's hazard communication program.

RESUMEN – SÍLICE CRISTALINA RESPIRABLE

1. Las exposiciones de sílice de nuestra compañía y los métodos utilizados para controlar el peligro y evitar que los empleados sean sobreexpuestos están incluidos en este programa y serán comunicados a los empleados afectados durante el entrenamiento.

2. Las partículas de sílice transportadas por el aire pueden penetrar profundamente en los pulmones y, con el tiempo, crear enfermedades pulmonares irreversibles ya veces fatales.

3. La sílice se puede encontrar en los materiales agregados utilizados para hacer asfalto, concreto premezclado, ladrillo / bloque, morteros, hormigón prefabricado, cerámica, vidrio y azulejos.

4. Las actividades que pueden causar que la sílice se vuelva aérea incluyen, pero no se limitan a, corte, astillado, martilleo, rompimiento de bolsas, mezclado y vertido.

5. La limpieza, como el barrido o el cepillado en seco, o el aire comprimido, también pueden crear un peligro de sílice.

6. Los trabajadores no pueden estar expuestos a concentraciones de sílice por encima del límite permisible de exposición (PEL), que es de 50 microgramos por metro cúbico de aire (50 µg / m3) promediado durante 8 horas.

7. Las medidas de control de exposición para algunas actividades se identifican en una tabla que se incluye en las normas de seguridad. Otras medidas de control deben ser determinadas basándose en las mediciones de exposición durante el trabajo que involucran una exposición, y pueden incluir supresión de polvo por agua, ventilación y protección respiratoria.

8. Los métodos húmedos suelen ser los más fáciles y eficaces. Los métodos de vacío también pueden funcionar, pero se debe tener cuidado de elegir el medio filtrante apropiado y la ubicación del escape. Los respiradores usados para reducir la exposición debajo del PEL pueden ser usados solamente por aquellos que están médicamente limpios para hacerlo y que han sido probados con el tipo específico de respirador a ser usado.

9. Para ciertos riesgos, los empleados estarán inscritos en un plan de control de exposición que incluya una vigilancia médica de línea de base y de seguimiento con el fin de monitorear los posibles efectos en la salud de la exposición.

10. Los registros médicos relacionados con la exposición y control de sílice se pondrán a disposición de los empleados afectados de acuerdo con las disposiciones reglamentarias de los requisitos de la norma OSHA sobre sustancias tóxicas y peligrosas (29 CFR 1910.1020) para acceso a la exposición de los empleados y los registros médicos.

11. Este programa y el reglamento federal sobre sílice de OSHA están a disposición de los empleados sin ningún costo, junto con la hoja de datos de seguridad (SDS) sobre sílice que se mantiene archivada como parte del programa de comunicación de riesgos de la compañía.

TABLE 1 EXPOSURE IDENTIFICATION AND CONTROL *29 CFR 1153(c)*																					
	Engineering Controls: ✔ per Table 1 specifications									*Work Practices: ✔ per Table 1 specifications and enter APF# or "None"*											
Table 1 Item Number and Description	Integrated Water Delivery System	Continuous Water Stream at Point of Impact	Shroud/ Dust Collection System	Climate Controlled Enclosed Cab with HEPA Filters	Water application and/or dust suppression as necessary	≤ 4 Hrs/ Shift	*Resp. APF*	> 4 Hrs/ Shift	*Resp. APF*	Outdoor Use	*Resp. APF*	Indoors / Encl. Area	*Resp. APF*								

PERFORMANCE OPTION - EXPOSURE ASSESSMENT FOR EACH EMPLOYEE *1926.1153(d)(2)(ii)*

First Name	Last Name	SSN	Job Classification	PPE	Equipment/Task	*Initial Samples (lab reports on file)* Sample Date or "Objective Data"*	Total Concentration µg/m³	Sampling Duration in Minutes	Per Minute Exposure µg/m³

SCHEDULED MONITORING OPTION - EXPOSURE ASSESSMENT FROM REPRESENTATIVE SAMPLES *1926.1153(d)(2)(iii)*

Equipment/Task	First Name	Last Name	SSN	Job Classification	PPE	*Initial Samples (lab reports on file)* Sample Date(s)	Total Concentration $\mu g/m^3$	Sampling Duration in Minutes	Per Minute Exposure $\mu g/m^3$

EXPOSURE CONTROL *29 CFR 1153(d)(3)*			*Engineering Controls, Work Practices, Respiratory Protection*						
Equipment/Task	Duration per Shift (hours)	8-Hr TWA Concentration ($\mu g/m^3$)	Specify "Table 1" or describe alternate work practices and engineering controls	Respiratory Protection APF	Respirator Use More than 30 days per year?	Medical Surveillance Required?	3-Month Date if >50$\mu g/m^3$	6-Month Date if >25$\mu g/m^3$ but <50$\mu g/m^3$
	≤ ^							
	≤ ^							
	≤ ^							
	≤ ^							
	≤ ^							
	≤ ^							
	≤ ^							
	≤ ^							
	≤ ^							
	≤ ^							

SITE ACCESS AND HOUSEKEEPING CONTROLS																	
	Access 1926.1153(a)(1)(iv)			Housekeeping 29 CFR 1153(f)													
			Sweeping/Brushing/Vacuuming					Compressed Air									
Equipment/Task	Describe 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 (e.g. work instructions, danger tape, barricades, signs, etc.)	Will activity require housekeeping to remove dust from surfaces or clothing? **If "no", stop here.**	If "yes", is wet sweeping or HEPA-filtered vacuuming feasible? **If "yes", stop here.**	If "no", and dry sweeping or dry brushing must be used instead, then identify other engineerings controls, work practices or respirator use that will keep employee silica exposure below the PEL.	Will the use of compressed air for cleaning clothing and surfaces be prohibited? **If "yes", stop here.**	If "no", will the use of compressed air be in conjunction with a ventilation system that effectively captures the dust cloud? **If "yes", stop here.**	If "No" because ventilation is not feasible, then identify other engineerings controls, work practices or respirator use that will keep employee silica exposure below the PEL.									

BLANK

TRAINING PLAN

A. *Communicate the contents of this program and any applicable regulations, and where and how to access both.*

B. *Administer the following quiz and make sure all participants know and understand the correct answers. This can be a group exercise, or the blank quiz at the end can be used by individual participants.*

1 Silicosis is usually reversible.
- **a** True
- ✓ **b** False

2 Silica exposure occurs primarily through
- **a** Absorption
- **b** Ingestion
- ✓ **c** Inhalation
- **d** Radiation

3 Housekeeping may actually increase the silica hazard.
- ✓ **a** True
- **b** False

4 The permissible exposure limit (PEL) for respirable silica is set at:
- ✓ **a** 50 µg/m^3
- **b** 70 µg/m^3
- **c** 42 µg/m^3

5 Options for reducing exposure to silica may include:
- **a** Dust suppression with wet methods
- **b** Filtered ventilation
- **c** Filtered vacuuming
- **d** Substituting non-silica containing materials
- **e** Respirator use
- ✓ **f** Any of the above

6 Wet methods are often the least effective way to reduce potential silica exposure.
- **a** True
- ✓ **b** False

7 How often will medical surveillance be made available?
- **a** 5 years
- **b** 2 years
- **c** 9 months
- ✓ **d** 3 years

1 La silicosis suele ser reversible
- **a** Verdadero
- ✓ **b** Falso

2 La manera en que los empleados suelen ser dañados por la sílice es
- **a** Absorción
- **b** Ingesta
- ✓ **c** Inhalación
- **d** Radiación

3 La limpieza puede aumentar el riesgo de sílice.
- ✓ **a** Verdadero
- **b** Falso

4 El límite de exposición permisible (PEL) para sílice respirable se establece en:
- ✓ **a** 50 µg/m^3
- **b** 70 µg/m^3
- **c** 42 µg/m^3

5 Las opciones para reducir la exposición a sílice pueden incluir:
- **a** Supresión de polvo con métodos húmedos
- **b** Ventilación filtrada
- **c** Filtrado de la aspiradora
- **d** Sustitución de los materiales que contienen sílice por otros materiales no sílice
- **e** Uso del respirador
- ✓ **f** Cualquiera de los anteriores

6 Los métodos húmedos son a menudo la manera menos eficaz de reducir la exposición potencial de sílice.
- **a** Verdadero
- ✓ **b** Falso

7 ¿Con qué frecuencia estará disponible la vigilancia médica?
- **a** 5 años
- **b** 2 años
- **c** 9 meses
- ✓ **d** 3 años

8 Silica levels can increase significantly during tear-out and demolition work.
- ✓ **a** True
- **b** False

9 A common work practice that can help limit silica is:
- **a** Using a blower to knock off the dust
- **b** Working downwind of a dust source
- ✓ **c** Keeping dusty roadways damp on worksites

10 Additional information on silica hazards and controls may be found by:
- **a** Accessing a complete copy of this silica program and exposure control plan
- **b** Accessing the safety data sheet (SDS) on silica from the company's HazCom program
- **c** Accessing the federal/state silica regulations
- **d** Asking your supervisor or safety representative for additional information
- ✓ **e** All of the above

8 Los niveles de sílice pueden aumentar significativamente durante el trabajo de rehabilitación y demolición.
- ✓ **a** Verdadero
- **b** Falso

9 Una práctica de trabajo común que puede ayudar a limitar la sílice es:
- **a** Uso de un soplador para eliminar el polvo
- **b** Trabajando a favor del viento de una fuente de polvo
- ✓ **c** Manteniendo las carreteras polvorientas húmedas en los lugares de trabajo

10 Puede obtenerse información adicional sobre peligros y controles de sílice:
- **a** Acceso a una copia completa de este programa de sílice y plan de control de exposición
- **b** Acceso a la ficha de datos de seguridad (SDS) sobre sílice del programa HazCom de la compañía
- **c** Acceso a las regulaciones federales / estatales de sílice
- **d** Solicitar a su supervisor o representante de seguridad información adicional
- ✓ **e** Todo lo de arriba

C. *Review the SDS on crystalline silica from the company's Hazard Communication program, with particular attention given to SDS Section 2, Hazard(s) identification; Section 4, First-aid measures; Section 8, Exposure controls/personal protection; and Section 11, Toxicological information.*

D. *Identity of the company's designated competent person(s) for the exposure control plan.*

E. *Explain the company's Exposure Control Plan (ECP) and review the exposure identification charts that reference Table 1 activities and/or data compiled from alternative sampling methods, along with the engineering controls, work practices, respiratory protection, housekeeping, and access procedures.*

F. *Discuss the participants' activities that create an exposure to silica and verify that these are already included in the exposure identification chart ((if not, promptly notify manager and safety representative).*

G. *Review the exposure controls that are prescribed in the exposure control plan and verify that each applicable method continues to be consistently and effectively implemented (if not, promptly notify manager and safety representative).*

H. *Review the purpose and a description of the medical surveillance program.*

I. *Complete the training report.*

Identify additional topic(s) and training resources (if any), check the training steps to verify completion, and include the date and location of the training and the supervisor/facilitator name and signature.

BLANK quiz for individual participant completion

PARTICIPANTS NAME – PRINTED *DATE*

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- **c** Acceso a las regulaciones federales / estatales de sílice
- **d** Solicitar a su supervisor o representante de seguridad información adicional
- **e** Todo lo de arriba

Signature