

Section 45
Brieser
Construction
SH&E
Manual

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The purpose of an exposure control plan (ECP) is to set out our approach to protecting workers from harmful exposure to airborne silica dust.

Silica
Exposure
Control Plan

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Silica Exposure

Brieser Construction

Purpose

The purpose of an exposure control plan (ECP) is to set out our approach to protecting workers from harmful exposure to airborne silica dust.

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 ECP, are followed at our worksites.

The work procedures we establish will protect not only our workers but all workers on our customers' worksites. This standard will outline the protective measures needed when performing tasks that create silica dusts such as; cutting, grinding, abrading or sawing concrete or natural rock.

All protective procedures will be driven using personal monitoring techniques as well as monitoring the area around dust generation activities. Section 26 of the Brieser SH&E Manual will detail the procedures for assessing risk for health issues such as silica exposure.

Scope

To define the requirements, responsibilities, and procedures necessary to reduce the risk of our employees to Silica exposure.

Definitions

Competent person -means 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 this policy

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

High-efficiency particulate air [HEPA] filter - means a filter that is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter.

Respirable crystalline silica - means quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the

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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.

Physician or other licensed health care professional [PLHCP] - means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by this policy

Responsibilities

The Program Administrator: Brieser Safety Manager

This person is responsible for:

- Issuing and administering this program and making sure that it satisfies all applicable federal, state and local requirements.
- Ensuring that employees have available to them initial and refresher training on the use of this policy.
- Conducting a periodic review of the effectiveness of the ECP. This would include a review of the available dust-control technologies to ensure these are selected and used when practical.
- Initiating sampling of worker exposure to concrete dust when there are non-standard work practices for which the control methods to be used have not been proven to be adequately protective.
- This Silica Exposure Control Plan must be evaluated at least once per year and as necessary. Situations where reevaluation may be necessary include regulatory updates, changes in equipment, and exposure incidents. Any changes resulting from this process must be communicated to affected employees.

Project Managers, Superintendents and Foremen

These people are responsible for:

- Substitution of less hazardous products for those that contain crystalline silica is required. Such as a Project Manager sourcing grout mix that has less silica content.

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- 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 plan (ECP) are readily available where and when they are required.
- Providing a job-specific ECP 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 silica dust generation work to be conducted
 - Control methods to be used and level of respiratory protection required
 - Ensuring supervisors and workers are educated and trained to an acceptable level of competency.
 - Coordinating the work with the prime contractor and other employers to ensure a safe work environment.
- 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

Human Resources

These people are responsible for:

- Maintaining records of training, fit-test results, crew talks, and inspections (equipment, PPE, work methods/practices).
- Maintaining training records for all employees included in the training sessions

Equipment Manager

These people are responsible for:

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- Ensuring that all required tools, equipment, and personal protective equipment are readily available to the field as required by the ECP.

Employees

- Knowing the hazards of silica dust exposure
- Using the assigned personal protective equipment in an effective and safe manner
- Using the appropriate control methods outlined within the Silica Control Permit
- Ensure you are trained on any equipment used
- 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

General

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

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

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- 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 Effects

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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Industrial Hygiene

Threshold Limit Value Time Weighted Average – TLV TWA

Brieser construction will employ the American Conference of Governmental Industrial Hygienists (ACGIH) values. The permissible exposure over an 8 hour work day is defined as the TLV TWA or Threshold Limit Value Time Weighted Average. The TLV TWA for Respirable Silica is 0.025 mg/m³.

A worker's exposure to silica is kept as low as reasonably achievable. Employees must not be exposed or expected to be exposed to airborne concentrations of silica more than 0.025 mg/m³ over an 8-hour period will be assessed by conducting personal air monitoring. Atmospheric testing results should be assessed before a worker is exposed.

Method of Compliance – Personal Air Monitoring

All protective procedures will be driven using personal monitoring techniques as well as monitoring the area around dust generation activities. Section 26 of the Brieser SH&E Manual will detail the procedures for assessing risk for health issues such as silica exposure.

All data shall be collected on the Brieser IH Sample Form and turned into the Safety Department for recordkeeping. See Appendix A

At times, the Brieser Safety Department may perform periodic personal exposure monitoring to ensure our employees are below the TLV TWA of 0.025 mg/m³.

Exposure Limits

Respirable Silica: TLV TWA: 0.025 mg/m³

Respirable Dust: TLV TWA: 2.5 mg/m³

Periodic Monitoring

The Brieser Safety Department will periodically monitor employee exposures to respirable silica dusts and respirable dust at least every 3 months if conditions permit using an industry standard cyclone to capture respirable particles.

Methods of Compliance

Where feasible, silica dust exposure must be controlled through engineering controls and work practices in preference to respiratory protection. Respirators can and should be used in

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conjunction with engineering, administrative & work practice controls. PPE should always be selected as the last line of defense and should not be the first and only control method.

In cases of exposure levels above the limit, a written plan to reduce that exposure will be prepared. This plan will be explained in the monitoring results letter sent to the exposed employee. The area superintendent will receive a copy of this notice and will be responsible for the prompt implementation of this plan.

A key step in developing a silica exposure control plan is to identify the work activities that would put workers at risk of exposure.

- Work activities — that may generate airborne silica dust—for silica, the route of exposure is through the inhalation of airborne dust. Brieser Construction has established a table to identify our work activities or more specifically the tools or equipment used that have the potential to create silica dusts. Please see [Appendix B, Silica Exposure Control Matrix](#).
- Identify workers at risk of exposure—At Brieser Construction we have identified three crafts that are at risk of exposure. They are; Finishers, Laborers & Operators.
- Amount of exposure—Brieser construction will rely on our Silica Exposure Control Matrix in conjunction with Industrial Hygiene exposure monitoring to determine the magnitude of exposure to respirable crystalline silica dusts.
- Duration of exposure—Brieser’s Silica Exposure Control Matrix is separated between workers who will be creating silica dusts for <4 hours and >4 as the workers who grind concrete for a full shift would be at greater risk than workers jackhammering for an hour.

Effective control options must be used to eliminate or reduce the risk to workers from the hazards of silica dust exposure. The following hierarchy of control measures must be followed:

- Elimination/Substitution (e.g., using products with less silica or using work methods that would eliminate the need for surface grinding)
- Engineering Controls (e.g., local exhaust ventilation, negative pressure enclosure, dust collection system)
- Work Practice Controls (e.g., water)
- Administrative controls (e.g., coordination of tasks with subcontractors, signage)
- The use of proper PPE such as gloves, coveralls and eye protection when exposed to silica. Personal protective equipment such as gloves, coveralls and eye protection will be used to control silica exposures.

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Our firm commits to developing knowledge and expertise about these controls, and to establishing policies/procedures to protect workers from harmful exposure and to minimize reliance on respirators. Effective engineering controls such as HEPA vacuum attachments and wetting methods, which control silica dust at its source, are readily available. These controls have been proven to reduce airborne dust levels significantly when selected and operated in accordance with best practices. We know that engineering controls alone do not reduce airborne silica to safe levels; so in most cases other control measures, including respiratory protection, will be necessary. However; engineering and work practice controls must be used to reduce employee exposure to respirable crystalline silica to the lowest feasible level and maintain it at that level when required.

If we take on a job that could release an unusually high amount of dust, and we are unsure of the adequacy of our control measures, we will conduct air sampling in order to ensure that control methods are protective.

We will reduce or eliminate worker exposure to silica dust by selecting a combination of the following controls listed in order of preference:

- Elimination and substitution
- Engineering
- Administrative
- Personal protective equipment

Elimination & Substitution

We recognize the importance of planning the work in order to minimize the amount of silica dust generated. During the project planning phase, we will advocate for the use grout mixes that either contains zero silica or the least amount as possible.

Engineering Controls

Selecting an appropriate control measure depends on the specifics of the operation. In some cases, local exhaust ventilation (LEV) is more effective at controlling exposure (e.g., during grinding operations) than wetting methods. In a different application, wetting may be more effective (e.g., during cutting operations) than LEV. However, using LEV may reduce the amount of final cleaning required, as the silica dust is captured.

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Our dust control systems may employ the following techniques:

- Local exhaust ventilation (LEV)
- Restricting or isolating the work activity with barriers or full enclosures (this may be the only option where LEV or WDS is not practical or effective). This includes use of a Negative Pressure Enclosure utilizing negative air machines

Local Exhaust Ventilation (LEV)

When LEV is used in our work, we will employ the following systems and safe work practices:

- Vacuum attachment systems to capture and control the dust at its source whenever possible.
- Dust control systems (used regularly and well maintained).
- Grinding wheels operated at the manufacturers recommended rpm (operating in excess of this can generate significantly higher airborne dust levels not to mention cause serious injury due to the wheel exploding).
- Retrofit shrouds or exhaust cowlings for corner grinding; use manufacturer-specified rpm speeds and a well-maintained HEPA vacuum.
- Diamond stone grinders, which allow for the use of a more efficient suction casing on the grinder, whenever practicable.
- HEPA or good quality, multi-stage vacuum units approved for use with silica dust. [The vacuum units should be capable of creating a target airflow of at least 70 cfm. This should achieve a face velocity at the shroud of about 1.3 m/s (260 fpm)—the higher the face velocity, the more dust captured at source.]
- Work planning, so that concrete grinding, sawing or cutting can be completed when wet (dust release can be significantly reduced).
- Good housekeeping work practices (for example, use vacuums with high-efficiency particulate air (HEPA) filters, or use wet sweeping).
- Train workers and supervisors on how to properly use and maintain the equipment.

Barriers and Enclosures

When barriers or enclosures are used in our work, we will follow these safe work practices:

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- The site foreman will determine the type and design of barrier or enclosure (based on the work activity and the work area) and ensure it is constructed in accordance with the work plan. Barriers may be simple hazard-flagging ribbon or more restrictive enclosure.
- We will use commercially available negative air units when constructing a full enclosure. And will outfit the enclosure with enough negative air units to maintain at a minimum 4 air changes per hour. See the Negative Air Machine equipment training before use.

Administrative/Work Practice Controls

We will be following Administrative work practice controls:

- The **Silica Exposure Control permit (Appendix A)** and the **Silica Exposure Control Matrix (Appendix B)** shall be utilized prior to the start of work.
- We will establish procedures for housekeeping, restricting work areas, personal hygiene, worker training, and supervision.
- As part of our project planning, we will assess when silica dust may be generated and plan to eliminate or control the dust at the source. We recognize that awareness and planning are key factors in the prevention of silicosis.
- Warning signs will be posted to warn workers about the hazards of silica and to specify any protective equipment required (for example, respirators).
- Work schedules will be posted at the boundaries of work areas contaminated with silica dust.
- Work that generates silica dust will be conducted after hours, when access to other unprotected workers cannot be restricted.
- We will develop a site-specific exposure control plan to cover project-specific issues (e.g., scope of work, project location and site-specific hazards) and to be kept available at the worksite.

When water spray systems are used in our work, we will follow these safe work practices:

- Pneumatic grinders will be used instead of electric-powered grinders if water is the method of control.
- Pressure and flow rate of water will be controlled in accordance with tool manufacturers' specifications (for cutting saws, a minimum of 0.5 liters of water per minute should be used).
- When sawing concrete or masonry, we will use only saws that provide water to the blade.
- Wet slurry will be cleaned from work surfaces when the work is completed, using a wet vacuum or wet sweeping.

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Respiratory Protection

Respirators shall be provided at Company expense and used by the employee in the following circumstances:

1. During the period, necessary to install and/or implement feasible engineering controls
2. Where feasible engineering controls and work practices by themselves are not sufficient to reduce employee exposure to or below the exposure limits.
3. During intermittent or limited duration work operations where engineering controls and work practices are not feasible or required
4. In emergencies.

The Brieser SH&E Manual Section 7 Respiratory Protection shall be referenced if the use of respirators will be used to control silica dust exposures on the jobsite.

Generally, for exposures in atmospheres between 0.025 mg/m³ and 0.125 mg/m³, the appropriate respirator will be a negative pressure respirator with P-100 HEPA cartridges. Filter elements must be changed at the end of the service life or at the beginning of each shift, whichever comes first.

Employees exposed to Silica shall be given adequate time to wash their face and respirator to prevent skin irritation and to change filter elements. Protective clothing should be provided as necessary to limit exposure to the eyes or skin.

The job supervisor is responsible to ensure the proper respirators are worn in the approved manner, and that all hygiene considerations (wash-up time, filter element changes and protective clothing) are followed.

Before an employee can use a negative pressure respirator for silica exposure, that employee must be fit tested properly on an annual basis. This fit test must follow the protocol for fit testing to be done at the appropriate intervals and Industrial Hygiene will assist operating and maintenance areas in determining which employees are to be included in this program. A current listing of fit tested employees will be maintained by the Safety/Industrial Hygiene Department as part of this written program. Employees without a current fit test shall not be assigned to jobs that are known to create silica exposures.

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Medical Surveillance

A medical surveillance program must be made available to those employees who are or may be exposed to silica:

- At no cost to the employee
- At a reasonable time and place
- For each employee who will be required under this policy to wear a respirator for 30 or more days per year
- All medical examination and procedures are performed by a PLHCP

Initial Exam

Brieser Construction will make available an initial baseline medical exam within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this policy within the last three years.

The examination shall consist of:

- A medical work history concentrating on silica exposure in the past, present and future. Any history of respiratory system dysfunction, including signs and symptoms of respiratory disease; history of tuberculosis; and smoking status and history.
- A physical exam with 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 some second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOH-approve spirometry course

Periodic Exams

Brieser shall make available medical examinations that include the procedures outline above at least every 3 years, or more frequently if recommended by the PLHCP


Recordkeeping & Training

- A copy of this policy is located on Brieser's Website

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- A copy of the PLHCP’s written report for the employee shall be kept in accordance with Brieser Construction’s Human Resources duties outline in Section 3 of this SH&E Manual
- Air monitoring data shall be kept in accordance with Brieser Construction’s Human Resources duties outline in Section 3 of this SH&E Manual
- Objective data shall be kept in accordance with Brieser Construction’s Human Resources duties outline in Section 3 of this SH&E Manual
- Brieser will ensure that each employee with respect to training can demonstrate knowledge and understanding of;
 - Health hazards associated with silica exposure
 - The tasks in their workplace that could result in exposure to respirable crystalline silica
 - Proper use, storage and maintenance of engineering controls, work practices and respirators
 - The contents of this policy
 - Who the competent person is on their site
 - The purpose and description of the medical surveillance program

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IH SAMPLING FORM					
Sample Description					
(Project Code-Yr/Mth/Day-Sample Description-Sample # (start with 001))					
Sample Type	(Personal) (Area) (Blank) (Bulk) (Grab) (Source)				
Person Sampled (Employee Last name, First Name)					
EHS Job (Job Description)	(Carpenter) (Finisher) (Iron Worker) (Laborer) (Operator) (Tech Eng) (Teamster)				
Collected By (Last name, First Name)					
Sample Period	(8 hour shift) (10 hour shift) (12 hour shift); (STEL)				TABS-
Calculation Method	(Zero) (Same)				Tasks
Sample Template	(Asbestos) (Benzene-Direct Reading) (BTX Full Shift)				Controls
	(BTEX- STEL) (Resp Silica) (Noise) (Welding)				Admin Controls
Media Type	(3M 3500 OVM)(Dosimeter)(3M 3720 Formaldehyde)				Eng. Solutions
	(Mercury SKC 520 or Assay Badge)(CT:Charcoal Tube)				Eye Protection
Media Number	(Direct Reading Instrument) (GammaRaell) (Vrae)				Foot Protection
	(3M eg5 Noise Dosimeter)				Gloves
Activity Description					Full Body Protection
Sample	Start	Date	Time	Minutes	Respirators
	Stop				(N95) (Supplied Air) (SAR) 1/2Mask APR (FF Multi Gas) (FF-OV) (1/2 Mask OV)
HS Equipment	(dose Badge) (Draeger Pump) (SKC Pump)(Sirius PID)				Latex
HS Equipment Serial Number	(RAE Benzene PID)(Sound Level Meter) (3M eg5 Noise Dosimeter)				Nitrile
					Neoprene
Calibrator	5)				PVC
Calibrator Serial Number	(RAE PID Cal gas) (MSA Sirius Galaxy)(Quest QC-10)				Tyvek Suit
Calibration	Initial	Final	Total Strokes		Respirators
					(N95) (Supplied Air) (SAR) 1/2Mask APR (FF Multi Gas) (FF-OV) (1/2 Mask OV)
Unit Of Measure	(PPM) (MG/M3) (L/min) (cc/min) (dBA)				Latex
Laboratory	(Galson Labs)				Nitrile
Exchange Rate	3dBA (only with noise, leave blank if not noise)				Neoprene
Direct Reading Results	(Non Detect)				PVC

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Silica Exposure Control Permit			
Date Completed:			
Crew Foreman:		Competent Person:	
Customer Site/Project #:			
Worker(s):			
Scope of work to be completed:			
Work start date:		Duration: <input type="checkbox"/> Days <input type="checkbox"/> Months <input type="checkbox"/> Years	
Workers trained in (training records must be available for review):			
Proper use of equipment	Y <input type="checkbox"/> N <input type="checkbox"/>	Proper use of admin & work practice controls	Y <input type="checkbox"/> N <input type="checkbox"/>
Proper use of engineering controls	Y <input type="checkbox"/> N <input type="checkbox"/>	Proper use of PPE	Y <input type="checkbox"/> N <input type="checkbox"/>
Proper disposal methods	Y <input type="checkbox"/> N <input type="checkbox"/>	Other (fall protection, confined spaces, etc.)	Y <input type="checkbox"/> N <input type="checkbox"/>
Respirators			
Required: Y <input type="checkbox"/> N <input type="checkbox"/>		Available: Y <input type="checkbox"/> N <input type="checkbox"/>	Fit-tested: Y <input type="checkbox"/> N <input type="checkbox"/>
Documents to be attached to control plan (<input checked="" type="checkbox"/> if present)			
<input type="checkbox"/> TSTI <input type="checkbox"/> SDS <input type="checkbox"/> Training records			
Supervisor Signature		Position:	Date:

BRIESER CONSTRUCTION GENERAL CONTRACTORS		DATE:	PROCEDURE:
		3-6-17	Appendix B: Silica Exposure Control Matrix
CORPORATE SAFETY, HEALTH & ENVIRONMENTAL MANUAL		Revision:	PAGE:
		01	19
STANDARD OPERATING PROCEDURE:		Silica Exposure Control Plan	
CROSS REFERENCE:	OSHA 29 CFR 1926.1153 Respirable Crystalline Silica ACGIH, TLV TWAs and BEIs		

This is a placeholder for the **Silica Exposure Control Matrix**

This document can be located on the Brieser Website under *Employee Resources/Brieser Forms*