

<Your Company Name>

# Silica Exposure Control Plan

ADMINISTRATOR NAME

Date Plan Implemented: \_\_\_\_\_

## Introduction

This Silica Exposure Control Plan (ECP) template has been developed for the dimension stone industry to assist in a variety of silica exposures in accordance with OSHA ruling CFR 1910.1053 which was made effective on June 23, 2016. Standard CFR 1910.1053 for General Industry and Maritime covers stone cutting and fabrication facilities.

Silica is the compound formed from the elements silicon (Si) and oxygen (O) and has a molecular form of SiO<sub>2</sub>. Silica is the second most common mineral on earth, found in the common form as “sand” and “rock.” The three main forms or ‘polymorphs’ of silica are alpha quartz, cristobalite, and tridymite. The polymer most abundant and most hazardous to human health is alpha quartz, and is commonly referred to as crystalline silica.

The health hazards of silica come from breathing in the dust. If crystalline silica becomes airborne through industrial activities, exposures to fine crystalline silica dust (*specifically exposure to the size fraction that is considered to be respirable*) can lead to disabling, sometimes fatal disease called silicosis.

Breathable airborne Silica is an ongoing concern and this ECP has been developed to enable stone cutting and fabrication shops to manage these silica exposures in a proactive manner.

## Instructions for Use

This plan is intended to be a template for stone companies to edit/revise for applicability to their individual company needs.

1. Take this Silica ECP and add relevant company and site-specific details, such as in the Silica ECP sections “Company Information” and “Annual Review.”
2. Add in the relevant task-specific guidance sheets to this Silica ECP as indicates in the Silica ECP section titled “Risk Assessment and Controls” and “Appendix A.”
3. Conduct a risk assessment as indicated in the site-specific assessment guidance sheet. Check off which situations will apply to your facility. Conduct this risk assessment twice: once as a planner and once as a supervisor. Document and retain these risk assessment records.
4. Implement controls determined by the risk assessment and develop applicable procedures, as indicated in the control guidance sheet.
5. Conduct site inspections to verify that the controls indicated are in use by personnel.
6. Validate that the controls are effective by collecting exposure monitoring data.
7. As required, implement additional controls to mitigate risk. Seek also to use engineering controls in order to reduce dependency on PPE.

## Disclaimer

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## **Section I – Company and Jobsite Information**

### **Company Information (The Company)**

[Company Name]

[Physical Address]

[Contact information – names and phone numbers of safety personnel]

### **Jobsite Information**

[Project name]

[Project address]

### **Safety Manager in Charge**

[Contact information – names and phone numbers of safety personnel]

## Section II - Purpose and Responsibilities

We have a duty to protect our workers from overexposure to crystalline silica (herein referred to as silica) during a variety of stone fabricating activities. According to OSHA, silica exposure is an *Extreme* risk in industry work sites. It is identified as a risk requiring special controls, including seeking the advice of experts. Studies show that a variety of fabricating activities generate airborne contaminants in excess of OSHA exposure limits. Effective controls are available to protect workers from harmful exposure.

A combination of controls measures may be required to achieve this objective. We commit to being diligent in our efforts to select the most effective control methods available, and to ensure that the best practices, as described in this exposure control plan (ECP), are followed within our facilities.

The work procedures we establish will not only protect our workers, but also any other workers within the facility.

This ECP applies to all personnel and service providers including third party companies and their employees who may be determined at risk while within the facility.

### **THE COMPANY IS RESPONSIBLE FOR THE FOLLOWING:**

- Implementing a suitable respirable silica exposure monitoring program, or otherwise ensuring representative exposure monitoring results are available. The purpose of the program will ensure that (over time) **The Company** has quantifiable silica exposure data available for all regularly occurring, as well as reasonably foreseeable, work activities.
- Ensure that all employees (e.g., Managers, Supervisors, and Workers) receive the necessary education and training related to this Policy, as well as project/task specific ECPs to work safely with silica.
- Maintain written records (i.e. exposure sampling, baseline health tests, inspections, respirator fit tests, ECP training, inspections, etc.) in accordance with **The Company's** record retention procedures/practices.
- Ensure that the materials (tools, equipment, and personal protective equipment [PPE]) and other resources required to implement and maintain this ECP are readily available.
- It is the **The Company's** responsibility to provide required materials and documentation in order to comply with other applicable health and safety requirements (e.g., Industry/Regulatory Information, Safety Data Sheets)
- Conduct an annual review (or more often if conditions change) of the ECP's effectiveness. Regularly evaluating new equipment and technologies that become available, as able/appropriate, purchasing the "best available" equipment/technologies (within **The Company's** capabilities). Equipment/technologies with silica dust suppression and/or capture technologies will generally be given preference over equipment/technologies that lack such.
- Coordinate work with others to ensure a safe work environment

**The Company** needs to make sure an exposure control plan is present with any subcontractors and enforce compliance. **The Company** needs to select service providers and subcontractors based on their available control strategies in order to minimize exposures.

**THE COMPANY SUPERVISORS ARE RESPONSIBLE FOR THE FOLLOWING:**

- Obtain a copy of the project/task specific ECPs (and/or other similar such information), and ensuring such are made available at each work site.
- Make sure that work is conducted in a manner that minimizes and adequately controls the risk to workers and others. This includes ensuring workers use appropriate engineering controls as well as administrative controls; they should only wear the necessary PPE as the last line of defense.
- Ensure that all the tools, equipment, PPE and materials (including water) necessary to implement the ECP is available (and in good working order) prior to allowing work activities to commence.
- Make sure that workers have been educated and trained in this exposure control plan. They must ensure that workers understand the plan's expectations, as well as enforce it.
- Ensuring that workers adhere to the project/task specific ECP, including PPE and personal hygiene (i.e., including be clean shaven where a respirator seals to the user's face) requirements.
- Select and implement the appropriate control measures to protect others (e.g., erecting of barricades and signage) who could be adversely affected by The Company's acts (or omissions).

**THE COMPANY EMPLOYEES ARE RESPONSIBLE FOR THE FOLLOWING:**

- Know and understand the hazards of silica dust exposure.
- Read, understand, and adhere to the controls set out in project/task specific ECPs when at risk. A copy of this plan, or a similar one, must be present where at-risk activities are underway.
- Use the assigned protective equipment in an effective and safe manner. For example, workers must be clean-shaven where a respirator seal is formed with the worker's face.
- Follow established work procedures as directed by the supervisor.
- Report (immediately) any unsafe conditions, unsafe acts, or improperly operating equipment to their supervisor.
- Report any exposure incidents or any signs or symptoms of illness from silica exposure to the employer.
- The workers will acknowledge that they understand the ECP's requirements prior to commencing their work activities.

## Section III – Understanding the Hazards & Risk

### Health Hazards from Silica Exposure

Silica exposure is predominantly associated with the inhalation of airborne crystalline silica. In general, quartz is the predominant form of crystalline silica; however, cristobalite does exist in certain materials. Exposure to silica is usually in the form of an airborne dust; however, other forms of airborne exposures are possible as well, such as mists. Silica inhalation is concerned with the respirable fraction of the dust. This is the fraction that is small enough to get deep into the lung where gas exchange takes place.

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 encountered and the duration of exposure:

- **Chronic silicosis:** develops after long-term exposure (10 or more years) 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 to a few 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, chronic obstructive pulmonary disease (COPD), kidney disease, and lung cancer. Silica is classified as a human carcinogen (Group I) by the International Agency for Research on Cancer (IARC).

Other hazardous materials may be present in the silica-containing materials or involved in the process that have additional health effects.

## Risk Identification

When silica containing materials are processed, disturbed, moved, or otherwise handled, silica exposure can occur. Worker exposure is primarily limited to inhalation. The presence of silica dust on skin, hair, clothing, and PPE represents the possibility of this dust being reintroduced into the air and then subsequently inhaled by the worker or other workers. Silica may also represent a mechanical abrasion hazard to the eye when concentrations are very elevated.

In general, inhalation exposure to silica can occur in three ways as a function of:

- the work location
- the activity (task); and/or
- the occurrence of unplanned events

## The Nature of the Hazard

Silica dust is not ordinary dust! The hazardous component of silica is the respirable fraction: this means the very small particles that can penetrate deep into the lung. Different types and sources of silica may have different size ranges. For example, dust generated from final polishing (dry) may be comprised almost entirely of respirable particles. In contrast, silica dust generated from rough cutting has a wider range of particle sizes (including respirable particles). Silica that is comprised mainly of respirable dust is less visible, because the particles do not block, scatter, and reflect light. The net result is that with many silica hazards, by the time it is visible, the silica levels are well above what would be defined as an acceptable risk.

*The absence of visible dust may not mean the absence of airborne silica hazard!*

Silica dust generated from sand, cements, or mortars, can come from existing fines in the dust, or it can come from breaking the grains apart during handling. The dust generated in high energy environments (like sand blasting) is newly fractured: this makes it potentially more toxic to the lung.

Employees can be exposed to silica when conducting activities such as:

- |                             |                                |                              |
|-----------------------------|--------------------------------|------------------------------|
| - Abrasive Blasting         | - Chipping or Scarifying Stone | - Moving or dumping piles of |
| - Cutting or Drilling Stone | or Concrete                    | concrete, rock, or sand      |
| - Concrete or Mortar Mixing | - Rock Crushing                | - Demolition of concrete or  |
| - Polishing Stone           | - Housekeeping/Cleaning        | brick                        |

## Airborne Action Level and Permissible Exposure Limits (PEL)

Crystalline silica, such as quartz and cristobalite, has Permissible Exposure Limits described by OSHA. However, as a suspected carcinogen, crystalline silica exposures should be reduced to levels as low as reasonably achievable.

CFR 1910.1053 “Respirable crystalline silica limits for General Industry.” See table below for prescribed exposure limits over an 8-hour time weighted average:

Action Level	Permissible Exposure Limit (PEL)
25 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$

## Airborne Action Level and Permissible Exposure Limits (PEL) (continued)

### ACTION LEVEL

If **The Company** has objective data demonstrating that employee exposure to respirable crystalline silica will remain below 25 micrograms per cubic meter of air ( $25 \mu\text{g}/\text{m}^3$ ), as an 8-hour time-weighted average (TWA) under all foreseeable activities and locations, then ***additional controls may NOT be required.***

### PERMISSIBLE EXPOSURE LIMITS (PEL)

**The Company** shall ensure that no employee is exposed to an airborne concentration of respirable crystalline silica in excess of 50 micrograms per cubic meter of air ( $50 \mu\text{g}/\text{m}^3$ ), calculated as an 8-hour TWA.

### Skin and Ingestion

Skin and ingestion exposure to silica is generally not thought to be a concern in and of itself; however, the reintroduction of silica back into the air creates an airborne hazard that warrants attention. Sometimes other hazardous ingredients may be present with silica. Such ingredients represent ingestion and skin hazards: thus, good hygiene practices, gloves, body protection (coveralls), and proper hand washing is required. In general, workers should limit skin contact with silica whenever possible.

## Section IV – Risk Assessment & Controls

Exposure to silica has been recognized as a concern in several industries including the dimension stone fabrication industry. While many job assessments have been completed within industry, individual site variations, configurations, and activities, as well as other site-specific conditions, may affect the exposure risk. *The only way to properly assess exposure levels in an individual facility is to conduct thorough testing of various job activities in multiple work areas.*

### Factors of Exposure Risk

A variety of factors impact the degree of exposure risk within a facility. Some factors that commonly apply to the majority of silica exposures are detailed below.

- **Time** – How long is the duration of the exposure? Cumulative exposure is a more reliable predictor of silica disease. As such, exposure levels are full-shift time-weighted averages (TWA). Some task-based exposures may last only minutes, while others may last the entire work shift.
- **Proximity** – How close are you to the emission source? The closer you are to the emission source; the higher airborne silica concentration is likely to be. As a general rule of thumb, keep sources of exposure at least three (3) feet (1 meter) away. Note: Even at a distance of three feet/one meter, a risk of exposure may still exist.
- **Relative Dustiness** – How dusty is the material or process? The dustier the material is, the more airborne dust is likely to be generated. It is important to recognize that the manner in which the material is disturbed can impact the dustiness. For example, a product that is not dusty when stationary, such as clean sand, can generate dust when it is poured from a bag into a bucket or container. This is especially important since, for silica, the respirable fraction is hazardous.
- **Energy** – Is energy being imparted into the silica containing material? The more energy, the greater the airborne concentration of silica. Energy can come from cutting, drilling, polishing, sand-blasting, chiseling, or dumping/loading of waste.
- **Quantity in Use** – How much is being used? Generally, the more product in use, the greater the airborne hazard created.
- **Percentage Silica** – What is the bulk silica percentage? Materials with higher silica concentrations (e.g., quartzites and sandstones) could result in more risk during processing.
- **Ventilation** – Can silica build up in the air? The amount of ventilation can make a significant difference to exposures. Exposures in well-ventilated environments, like wide-open windy outdoor locations, may be less significant than exposures in poorly ventilated indoor environments. Wind can dilute the hazard, but can also take the hazard from one area and make it a hazard for others downwind.

### Risk Assessment

Risk may also vary with individual processes, operations, or locations within a facility. Personnel at risk for silica exposure need to:

Conduct risk assessments for their specific operations as a component of their health and safety program; and

Implement appropriate controls to mitigate risks to acceptable levels

Common stone fabrication activities, risks, and controls are outlined in the table in Appendix A. Additional activities, risks, and controls may be added for specific companies or sites.

## Controls

Risk assessment and evaluations lead to the implementation of effective exposure controls. Most Occupational Health and Safety Regulations require employers to select controls based on the following hierarchy:

- Elimination and Substitution
- Engineering Controls (i.e. local exhaust ventilation, performing “wet” operations, barriers);
- Administrative controls (i.e. limiting time workers are in a potentially contaminated area, procedures and signage); and
- Personal Protective Equipment (i.e. respirators, disposable clothing)

Because silica exposure may increase the risk of lung cancer, exposure should be maintained as low as reasonably achievable in keeping with the theory that even small doses may represent a risk.

Whenever possible, **The Company** will substitute products containing silica with products that do not contain (or contain a lower percentage of) crystalline silica. Some varieties of stone such as marble, limestones, and travertines contain little or no quartz or silica that could become airborne. Conversely, manufactured engineered quartz products contain relatively high concentrations of quartz that can become airborne silica when worked. Material substitution can only be done when the mineral composition of the material is known and documented. While the substitution of non-silica based products is not applicable to certain stone fabrication activities, **The Company** recognizes the importance of planning work in order to minimize the amount of silica dust generated. During the planning process, **The Company** will advocate for the use of methods that reduce the need for cutting, grinding, or drilling of stone surfaces.

Of these controls, *the use of engineering controls is typically the most desirable and effective*. Personal protective controls should only be considered when engineering controls and/or administrative controls are either not practical or not effective on their own.

## Engineering Controls

In many cases, engineering controls offer the most effective exposure control. This is because exposure can be very significant, which means using respiratory protection is less successful. Another reason is the challenge of managing exposures to adjacent personnel. In some instances, engineering controls can be very simple and highly effective, such as the use of wet operations to prevent dust generation.

Common engineering controls that are applicable to silica exposure control include (but not limited to) the following:

- Wet Dust Suppression (WDS) systems;
- Enclosed processes;
- Enclosed people spaces;
- Local Exhaust Ventilation (LEV);
- Filtration (general and source-capture);

- Barriers; and
- Remote monitoring systems such as cameras to remove the need for a worker to be present.

Implementing changing in process often creates other health and safety risks that require assessment and management. Engineering controls typically require on-going maintenance to be effective. Worker training and other administrative controls are also necessary.

### Administrative Controls

Personnel in the facility must follow established practices and procedures to limit contact with or exposure to silica. Where engineering controls are in place, procedures for their use and maintenance must exist.

In *Regulated Areas* (an area, demarcated by the employer, where an employee’s exposure to airborne concentrations of respirable silica exceeds or can reasonably be expected to exceed the PEL), signs must indicate that a silica hazard is present and that respiratory protection is required.

In general, proximity and duration of exposure can be managed by way of administrative controls. Examples include procedures limiting access, limiting time in select areas, maximizing distance from sources, and control zones indicating where personnel are permitted, and when and what type of respiratory protection is required.

Procedures are also required for the use of a variety of PPE, including respirators, and for personal decontamination. General Housekeeping and procedural activities for all employees can also be covered through administrative controls including:

- Regular washdown procedures (daily or per shift)
- Dust mats at doorways between work zones
- Rules against use of compressed air to clean dust from work clothes or surfaces
- Proper handling of contaminated clothing or safety equipment

### Personal Protective Equipment (PPE)

#### Respirators

*Different types of silica-generating activities or operations require different levels of respiratory protection. Options range from disposable partial-face dust masks, to tight-fitting full-face powered-air purifying respirators. These different respirator types correspond with different exposure risk levels.*

**NOTE:** *The use of respirators may include additional training and record keeping requirements pursuant to OSHA 29 CFR 1910.134.*

The following table provides recommended respiratory protection levels based on the measured or anticipated exposure levels:

Respirator	Protection Factor	Typical Silica Activity
N95	Less than 50 µg/m <sup>3</sup>	- Used on voluntary basis to control low exposures
Half-face with HEPA filters	50 – 500 µg/m <sup>3</sup>	- Housekeeping (wet method)

		- Saw cutting (wet method) - Drilling (wet method) - Power tools with dust collection
Full-face with HEPA filters	500 – 5,000 µg/m <sup>3</sup>	- Mixing grout in bulk - Vacuum abrasive blasting
SCBA / CABA	Above 5,000 µg/m <sup>3</sup>	- Abrasive Blasting

Regardless of the type of respiratory protection used, a respiratory protection program must be in place to ensure that workers are clean-shaven, have been fit-tested and are trained in the use, care, and maintenance of their respirators. Respirators will be used, cleaned, and stored in accordance with the respiratory protection program.

If respirators and a respiratory protection plan are implemented, basic care and maintenance of respirators will include a secure, dustless, and chemical free storage environment with the open end facing down.

The presence of other chemical hazards may necessitate the need for a higher degree or different type of respiratory protection.

#### Protective Clothing

Decontamination is an integral component of exposure control. Disposable or reusable work clothing to keep from spreading the dust or bringing the dust home. The goal is to remove contamination of skin and personal protective equipment to prevent the potential inadvertent secondary inhalation of contaminants. Soiled uniforms or clothing must not be worn off site and must be laundered on a regular basis. Inadvertent secondary inhalation may occur when silica dust that is present on PPE, skin or head hair is disturbed, re-entraining the silica into the air.

#### Gloves

Gloves suited for the physical hazards of the task are recommended, but not required, for protection against silica. It is not generally considered a skin hazard.

#### Eye and/or Face Protection

Safety glasses, goggles, or full-face shields should be worn to keep stone fragments and dust out of the eyes and face.

#### Safety Footwear

Steel-toed footwear, with or without water protection is advised to minimize foot/toe injuries from falling pieces of stone.

## Section V – Action Item Plan

This is the most important part of this Exposure Control Plan. It is where you determine which category of risk applies to your company, implement controls to protect workers' health, and comply with the law.

Qualitative assessment involves judging exposures based on various factors. Assessing the factors present, and how similar or dissimilar they are to various exposures, allows you to determine how much risk is present. Risk can be categorized into Tiers. Use exposure measurement to verify those qualitative assessments.

Exposure measurement is used to answer a variety of questions. It is important that one first knows what questions you want to answer and then design your measurement strategy to answer those questions. Only after exposure measurements have been assessed, can we begin to design and implement a comprehensive strategy to minimize exposure.

Refer to **Appendix A** for a summary of action items for **THE COMPANY** to be implemented.

### Hygiene Facilities and Decontamination Procedures

In order to protect workers, decontamination is an integral component of exposure control. The goal is to remove contamination of skin and personal protective equipment to prevent inadvertent secondary inhalation of contaminants. Inadvertent secondary inhalation may occur when silica dust that is present on PPE, skin, hair, or clothing is disturbed, which reintroduces the silica into the air.

#### **Company Action Items** (edit/delete those that do not apply):

- **SELECT, REMOVE, OR ADD AS APPLICABLE TO YOUR FACILITY**
- Adequate washing facilities must be provided on site to enable worker decontamination.
- Prior to eating, drinking, and leaving the worksite, workers should thoroughly wash their face and hands with a mild detergent solution.
- Eating and drinking is restricted to authorized areas only.
- A shower is not required, but may be advisable for those working with bulk silica dust and high exposures.
- Procedures are required for decontamination and, specifically, the use of disposable protective clothing. Procedures should consist of the following:
  1. Remove disposable protective clothing and place in waste receptacle
  2. Remove contaminated clothing/uniforms and place in laundry receptacle
  3. Wash hands, face, head, and respirator
  4. Remove respiratory protection
  5. Properly store respirator
- **SELECT, REMOVE, OR ADD AS APPLICABLE TO YOUR FACILITY**
- **SELECT, REMOVE, OR ADD AS APPLICABLE TO YOUR FACILITY**
- **SELECT, REMOVE, OR ADD AS APPLICABLE TO YOUR FACILITY**

## Medical Surveillance and Health Monitoring

### Company Action Items (edit/delete those that do not apply):

- **Monitoring Program:** Beginning on June 23, 2018, a program of monitoring and evaluating worker health is required for employees who will be exposed to respirable crystalline silica at or above the PEL level ( $50 \mu\text{g}/\text{m}^3$ ) for 30 or more days per year.
  - If initial monitoring indicates that employee exposures are below the action level ( $25 \mu\text{g}/\text{m}^3$ ), no further monitoring is required.
  - If the most recent exposure monitoring reveals employee exposures at or above the action level ( $25 \mu\text{g}/\text{m}^3$ ), but at or below PEL ( $50 \mu\text{g}/\text{m}^3$ ), the employer must repeat monitoring with six months of the most recent monitoring.
  - If the most recent exposure monitoring reveals employee exposures above the PEL ( $50 \mu\text{g}/\text{m}^3$ ), the employer must repeat monitoring within three months of the most recent monitoring.
  - When two non-initial monitoring results taken consecutively, at least 7 days apart but within 6 months of each other, are below the action level ( $25 \mu\text{g}/\text{m}^3$ ), employers may stop monitoring for employees represented by those results, as long as no changes occur that could reasonably be expected to result in new or additional exposures at or above the action level.

- **Medical Surveillance:** Beginning on June 23, 2018, the requirement for medical surveillance will begin for employees who will be exposed to silica above the PEL ( $50 \mu\text{g}/\text{m}^3$ ) for 30 or more days per year.

Beginning on June 23, 2020, the requirement for medical surveillance will be adjusted to include employees who will be exposed to silica at or above the action level ( $25 \mu\text{g}/\text{m}^3$ ) for 30 or more days per year. **The Company** shall ensure that all medical examinations and procedures required by this section be performed by a Physician or Licensed Health Care Professional [PLHCP].

Monitoring will include an initial (baseline) medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this section in the last three years.

The examination shall consist of:

1. A medical work history with emphasis on past, present, or anticipated exposure to respirable crystalline silica, dust, or other agents affecting the respiratory system, and any history of respiratory system dysfunction.
2. A physical examination with emphasis on the respiratory system
3. A full chest X-ray interpreted and classified by a NIOSH-certified B Reader
4. A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV) and FEV/FVC ratio, administered by a NIOSH-approved spirometry technician.
5. Testing for latent tuberculosis infection; and
6. Any other tests deemed appropriate by the PLHCP

- **3-Year Medical Surveillance:** **The Company** shall make periodic examinations available as described above at least every three years, or more frequently if recommended by the PLHCP.
- **PLHCP Reporting:** Information provided by **The Company** to the PLHCP should include:
  - A description of the employee's former, current, and anticipated duties as they relate to silica exposure
  - The employee's former, current, and anticipated levels of occupational exposure to silica
  - A description of any PPE used or to be used by the employee
  - Information from records of employment-related medical examinations currently within control of the employer

The PLHCP's written medical report for the employee shall contain:

- A statement indicating the results of the medical examination, including any medical conditions that would place the employee at increased risk to health from silica exposure.
- Any recommended limitations on the employee's use of respirators
- Any recommended limitations on the employee's exposure to silica; and
- A statement that the employee should be examined by a specialist if the chest X-ray is classified 1/0 or higher by the B Reader.

The PLHCP's written medical report for the employer shall contain:

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

With the employee's written consent, the PLHCP's medical report to the employer shall also contain:

- Any recommended limitations on the employee's exposure to silica
- A statement that the employee should be examined by a specialist if the chest X-ray is classified 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

The employer shall ensure that the employee receives a copy of the PLHCP's written medical opinions to the employer within 30 days of each medical examination.

- **Additional Examinations:** Additional specialist examinations shall be made available by the employer as the PLHCP's written medical opinion indicates. Employer will have the same information obligations as outlined above for the PLHCP. Specialist and Employer will have the same information obligations to the Employee as outlined above for the PLHCP.

## Communication and Training

**The Company** shall make sure that applicable records and objective data are maintained and made available in accordance with OSHA 29 CFR 1910.1020.

### **Company Action Items** (edit/delete those that do not apply):

- **Establish a Training Program:** **The Company** shall include crystalline silica in the overall Workplace Hazard Communication training in accordance with OSHA 29 CFR 1910.1200. The following MINIMUM key hazards shall be addressed: Cancer, lung effects, immune system effects, and kidney effects. Consult [www.naturalstoneinstitute.org/safety](http://www.naturalstoneinstitute.org/safety) and [www.naturalstoneinstitute.org/university](http://www.naturalstoneinstitute.org/university) for stone industry specific training courses.
- **Signage:** The employer shall post signs at all entrances to REGULATED AREAS where the exposure to silica exceeds, or can reasonably be expected to exceed the PEL (50 µg/m<sup>3</sup>).
- **Employee Competency:** **The Company** shall ensure that each employee covered by this section can demonstrate knowledge and understanding of the following:
  - Health hazards associated with exposure to respirable crystalline silica
  - Specific tasks in the workplace that could result in exposure to silica exposure
  - Specific measures **The Company** has implemented to protect employees from silica exposure, including engineering controls, administrative controls, work practices, and respirators to be used.
  - The contents of this section
  - The purpose and description the Medical Surveillance Program – a copy of this program will be made readily available without cost to each employee covered by this section.
- **Air Monitoring:** **The Company** shall make and maintain an accurate record of all air monitoring exposure measurements taken to assess employee exposure to respirable silica. This record shall include at least the following information:
  - The date of the measurement for each sample taken
  - The task monitored and location within the facility
  - Sampling and analytical testing methods used (by the testing agency)
  - Number, duration, and results of samples taken
  - Identity of the laboratory that performed the analysis
  - Type of PPE worn by the employee(s) monitored
  - Name, social security number, and job classification of all employees represented by monitoring, indicating which employees were actually monitored.
- **Other Record Keeping:** **The Company** shall make and maintain an accurate record of all objective data relied upon to comply with OSHA requirement to include:
  - 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
  - Other data relevant to the process, task, activity, material, or exposures

## Communication and Training (continued)

- **Training:** Training will be performed by **The Company** or **The Company's** designate.
  - Records of attendance, dates of training, and training material will be documented and retained.
  - Additional training or reference material on silica exposure will be made available to employees upon request.
- **Training Topics:**
  - Health hazards of silica exposure
  - Operations that can produce silica exposure
  - Engineering controls and safe work practices used to protect workers
  - The importance of proper equipment control and maintenance
  - Housekeeping procedures
  - Proper use of respirators and the respirator program
  - Personal hygiene decontamination procedures to reduce exposures
  - Review the details of the exposure control plan for silica (this document)

## Section VI – Annual Review

This ECP will be reviewed at least annually and updated as necessary by **The Company**.

This review should take into account any voluntary certification programs in place, as well as any changes in regulatory requirements.

Considerations should also include new equipment or new tasks involving silica exposure. Additional monitoring would be required if such a change is reasonably expected to result in new or additional exposures to silica.

Substitution and control technologies are evolving quickly and must be considered in the annual review.

Proposed changes to this practice should be directed to **The Company Safety/HR Manager**.

## Definitions

**ACGIH** - American Conference of Governmental Industrial Hygienists

**Action Level** - 25 micrograms per cubic meter of air ( $25 \mu\text{g}/\text{m}^3$ ), as an 8-hour time-weighted average (TWA)

**APR** - Air Purifying Respirator

**ECP** - Exposure Control Plan.

**Exposure Level** - the maximum allowable exposure to a chemical or other agent or hazard. It is often expressed as a time weighted average (TWA) over an eight hour period. Exposures longer than eight hours are often adjusted to account for extended exposure and reduced recovery time. Exposure levels can also be referred to as occupational exposure levels (OEL) or permissible exposure limit (PEL).

**Heavy Metals** - general a term used to describe metals with high atomic weights that are very toxic such as mercury, cadmium, lead, arsenic, manganese, chromium, etc.

**Mist** - the presence of liquid droplets suspended in the air

**(M)SDS** - Material Safety Data Sheet or Safety Data Sheet

**NIOSH** - National Institute of Occupational Safety and Health – a federal department of the Center for Disease Control (CDC) in the United States of America. NIOSH is responsible for conducting research and making recommendations for the prevention of work-related disease and injury.

**NORM** - Naturally occurring radioactive materials. These are typically decay products of thorium and uranium such as radium-226, radium-228, radon-222 and lead-210. NORM may be concentrated in oil and gas process equipment in the form of gas, sludge, scales and films. Certain products such as refractory brick insulation may naturally contain NORM.

**OSHA** – Occupational Safety and Health Administration

**PLHCP** – Physician or Licensed Health Care Professional

**PAPR** – Powered Air Purifying Respirator. A respirator that is equipped with a filter and a blower motor such that a slight positive pressure within the face piece is created. PAPR's can be either tight-fitting or loose-fitting.

**PEL** – Permissible Exposure Limit - 50 micrograms per cubic meter of air ( $50 \mu\text{g}/\text{m}^3$ ), calculated as an 8-hour TWA

**Respirable** - Delineates a specific size of airborne contaminant that is capable of accessing the lower regions of the lung where gas exchange takes place. A variety of definitions exist but in general airborne particulate that has a diameter of less than 10 micrometers is regarded as respirable.

**Silica (Quartz or Cristobalite)** - an abundant crystal form of silica that can be present in many dry products, present in refractory brick insulation, and present in naturally occurring products such as sand, cement and soil and rock. It is highly toxic and can cause serious disease and lung cancer.

**Silicosis** - A progressive and often fatal lung disease that is caused by the inhalation of respirable crystalline silica such as quartz or cristobalite. Silicosis is an auto-immune disease where the body reacts to the presence of the silica in the lung with the formation of scar tissue that leads to difficulty in breathing and reduced gas exchange in the lungs.

**Spirometry** - tests that measure pulmonary lung function (PFT) in order to diagnose a variety of lung diseases. Often includes the forced vital capacity (FEV) and forced expiratory volume in one second (FEV(1)) tests.

**TWA** -Time-Weighted Average (exposure measurements averaged over a normal eight-hour work shift)

## Appendix A: Company-Specific and Task-Specific Exposures and Controls

The Company will ensure that suitable written procedures for controlling the risk of silica exposure are developed. This document/table summarizes the silica control options generally available on The Company sites/projects, and will be complimented with project/tasks specific Exposure Control Plans as necessary. This document and any supplemental work procedures/ECPs will be made readily available for review by all affected workers.

**EDITABLE – EDIT/ADD FOR YOUR COMPANY’S SPECIFIC DUTIES**

### APPENDIX A: COMPANY-SPECIFIC AND TASK-SPECIFIC EXPOSURES AND CONTROLS

Division/Task		Control Methods	Respiratory Protection	Work Practices
Stone Fabrication	Use of Bridge Saw	Integral Wet Dust Suppression System using built in blade water feed nozzle.	No respirators are required during normal operations.	<p>Ensure that water supply to the saw is turned on and operational before starting the saw.</p> <p>Ensure that water nozzles are working and aimed correctly at cutting area.</p> <p>Ensure that water is flowing to the cutting area prior to blade making contact with stone.</p>
Stone Fabrication	Use of Waterjet	Submerged cutting of workpiece	No respirators are required during normal operations.	<p>Ensure that tank water level is adequate and tank pump is operating.</p> <p>Ensure that workpiece is submerged prior to cutting.</p>
Stone Fabrication	Use of CNC Router	Integral Wet Dust Suppression System using built in internal (through tool) and external “Halo” water.	No respirators are required during normal operations.	<p>Ensure that water supply to the machine is turned on and operational before starting the CNC.</p> <p>Ensure that external water Halo nozzles are correctly aimed at the cutting area.</p> <p>Ensure that water is flowing through the tool and through the Halo prior to cutting blade making contact with stone.</p>

Stone Fabrication	Use of Inline Edge Polisher (Vertical or Horizontal)	Integral Wet Dust Suppression System using built in internal water delivery system.	No respirators are required during normal operations.	Ensure that water supply to the machine is turned on and operational before starting the machine.  Ensure that water is flowing prior to feeding any stone pieces into the machine.
Stone Fabrication	Use of Radial Arm Workstation	Integral Wet Dust Suppression System using built in internal water delivery system	No respirators are required during normal operations.	Ensure that Water Supply to the machine is turned on and operational before starting the machine.  Ensure that water is flowing through the spindle prior to making contact with stone.
Stone Fabrication	Handheld Angle Grinder (Wet)	Integral Wet Dust Suppression System or External Water directed at point of contact.	No respirators are required during normal operations.	Ensure that water supply to the tool is turned on and operational before using the grinder.  Ensure that water is flowing through the tool or directed at the point of contact with stone.
Stone Fabrication	Handheld Angle Grinder (Dry)	Dry working may only be performed with grinder equipped with shroud attached to a HEPA-filtered vacuum.	No respirators are required during normal operations.	Check that shroud is intact and properly installed. Keep shroud flush with workpiece.  Ensure that HEPA filter is correctly installed and operational in vacuum.
Stone Fabrication	Handheld Saw (Cutting)	Integral Wet Dust Suppression System or External Water directed at point of contact	No respirators are required during normal operations.	Ensure that water supply to the tool is turned on and operational before using the saw.  Ensure that water is flowing through the tool or directed at the point of contact with stone.
Stone Fabrication	Handheld Pneumatic Polisher (Wet)	Integral Wet Dust Suppression System using through-tool water feed.	No respirators are required during normal operations.	Ensure that water supply to the tool is turned on and operational before using the polisher.  Ensure that water is flowing through the polisher prior to tooling making contact with stone.
Stone Fabrication	Handheld Polisher (Dry)	Dry polishing may only be performed with polisher equipped with shroud	No respirators are required	Check that shroud is intact and properly installed. Keep shroud flush with workpiece.

		and attached to a HEPA-filtered vacuum.	during normal operations.	Ensure that HEPA filter is correctly installed and operational in vacuum.
Stone Fabrication	Manual Router for Edge Profiles	Integral Wet Dust Suppression System using through-tool and auxiliary water feed.	No respirators are required during normal operations.	Ensure that water supply to the tool is turned on and operational before using the router. Ensure water is flowing through the tool prior to making contact with stone.
Stone Fabrication	Cleaning of Stone Pieces	Wet Dust Suppression using water hoses and squeegees	No respirators are required during normal operations.	<b>NO DRY BRUSHING/SWEEPING! NO COMPRESSED AIR!</b>
Housekeeping	Floor Cleaning	Wet Dust Suppression using water hoses and squeegees to move contaminants into water filtration system before and after shift begins	No respirators are required during normal operations.	<b>NO DRY SWEEPING! NO COMPRESSED AIR!</b>
Maintenance	Filter Press Pre-Coat	Additional ventilation or source-capture filtration over mixing tank	N95 Mask or Respirator (See Respiratory Protection Standard)	
Maintenance	Filter Press Cleaning	Additional ventilation or source-capture filtration when plates are handled	N95 Mask or Respirator (See Respiratory Protection Standard)	
Maintenance	Loading Waterjet Abrasive	Additional Ventilation or source-capture filtration when abrasive is handled or loaded	N95 Mask or Respirator (See Respiratory Protection Standard)	

## **Company Task – Specific Exposures and Controls**

(Add as needed)