

Document Name: Silica Exposure Control Program	Control Number:			
Revision Date: 08/13/26	Revision Number: 1			
Revised By: Ligia Pascual	Owner: Safety			

Silica Exposure Control Program

1. Purpose

We have a duty to protect our workers from overexposure to crystalline silica (herein referred to as silica). 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 exposure control plan (ECP), are followed within our facility.

2. Scope

This Crystalline Silica Exposure Control Plan applies to all employees who have the potential to be exposed to Respirable Crystalline Silica when covered by the OSHA Standard. The OSHA Respirable Crystalline Silica Standard (29 CFR 1910.1053) applies to all occupational exposures to Respirable Crystalline Silica in the work place, except where employee exposure will remain below 25 micrograms of Respirable Crystalline Silica per cubic meter of air (25 µg/m³) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

3. Responsibilities

- **Site/Plant Manager**
 - 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 quantifiable silica exposure data is 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 plan, 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 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.
 - Conduct an annual review (or more often if conditions change) of the ECP's effectiveness.
 - Regularly evaluate new equipment and technologies that become available, as able/appropriate, purchasing the "best available" equipment/technologies.
- **EHS Manager/Coordinator or Safety Program Owner**
 - Develop and implement the site exposure control plan.
 - Annually review the program for effectiveness and update as necessary.
 - Provide or coordinate training for all required employees.
 - Maintain training records.
- **Supervisors**
 - Ensure employees are trained and comply with the requirements of this plan.

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- **Employees**

- 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.

4. Understanding the Hazards & Risks

Health Hazards from Silica Exposure

Silica exposure is predominantly associated with the inhalation of airborne crystalline silica. 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.

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

1. Shortness of breath
2. Severe cough
3. Weakness
4. 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).

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

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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.

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

Airborne Action Level and Permissible Exposure Limits (PEL)

Crystalline silica 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 µg/m ³	50 µg/m ³

ACTION LEVEL

If objective data demonstrates that employee exposure to respirable crystalline silica will remain below 25 micrograms per cubic meter of air (25 µg/m³), 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)

No employee shall be exposed to an airborne concentration of respirable crystalline silica in excess of 50 micrograms per cubic meter of air (50 µg/m³), calculated as an 8-hour TWA.

5. Risk Assessment & Controls

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

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(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 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

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.

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.

Controls

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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.

Engineering Controls

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.

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 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.

6. Personal Protective Equipment (PPE)

Respirators

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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 $\mu\text{g}/\text{m}^3$	- Used on voluntary basis to control low exposures
Half-face with HEPA filters	50 – 500 $\mu\text{g}/\text{m}^3$	- Housekeeping (wet method) - Saw cutting (wet method) - Drilling (wet method) - Power tools with dust collection
Full-face with HEPA filters	500 – 5,000 $\mu\text{g}/\text{m}^3$	- Vacuum 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.

Protective Clothing

Decontamination is an integral component of exposure control. 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.

7. Medical Surveillance and Health Monitoring

Monitoring Program: 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.

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- 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: 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. Medical examinations and procedures required by this section shall 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: Periodic examinations shall be available as described above at least every three years, or more frequently if recommended by the PLHCP.

PLHCP Reporting: 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

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- 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.

8. Communication and Training

Applicable records and objective data are maintained and made available in accordance with OSHA 29 CFR 1910.1020.

- **Training Program:** Shall include crystalline silica in the overall Workplace Hazard Communication training in accordance with OSHA 29 CFR 1910.1200.
 - 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:**

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- 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)
- **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/m³).
- **Employee Competency:** Each employee covered by this will be required to 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 OLDCASTLE INFRASTRUCTURE – Cannon Falls 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:** Must 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:** 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

9. Contractor Coordination

- The host location shall inform contractors of known silica hazards, affected areas, and required site controls.
- Contractors shall provide and implement their own compliant silica exposure control procedures for the work they perform.

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- Contractors shall coordinate high-dust work, access restrictions, housekeeping, and emergency arrangements with the site representative before work begins.
- Site management may stop contractor work when controls are absent or ineffective.

10. Control Failure or Unexpected Dust Release

- Prevent unauthorized entry and notify the supervisor or designated site contact.
- Shut down, isolate, or repair the source only when it can be done safely and under applicable lockout/tagout or confined-space procedures.
- Use approved cleanup methods. Do not dry sweep or disperse the dust with compressed air.
- Contact Safety to determine whether exposure assessment, medical consultation, incident reporting, or corrective action is required before work resumes.

11. Annual Review

This ECP will be reviewed at least annually and updated as necessary. 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.

Review Item	Yes / No / N/A	Comments / Corrective Action
Current silica-generating tasks and materials identified		
Exposure assessments or objective data remain representative		
Engineering controls maintained and effective		
Approved housekeeping methods in use		
Respirator requirements and fit tests current		
Medical surveillance eligibility reviewed		
Training and contractor coordination current		
Corrective actions assigned and tracked		

Reviewed By: _____ Date: _____

Next Review Due: _____

12. Task Control Table

Task / Exposure Source	Minimum Control Expectations	Additional Actions

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Task / Exposure Source	Minimum Control Expectations	Additional Actions

Appendix A – RMC Task Control Table

Task / Exposure Source	Minimum Control Expectations	Additional Actions
Sand or aggregate receiving and transfer	Operate enclosed transfer points and dust collection; maintain seals; use water suppression where compatible with the process.	Limit access during upset conditions; correct leaks or dust collector failures before normal operation resumes.
Batch plant and conveyor housekeeping	Use HEPA-filtered vacuuming, wet sweeping, or another method that minimizes airborne dust.	Do not dry sweep or dry brush unless safer methods are not feasible and the exception is documented.
Plant yard and road dust	Use water application or other effective dust suppression; maintain roadways; enforce site speed limits.	Keep vehicle windows closed when relying on an enclosed, filtered cab.
Mixer drum, chute, hopper, or central mixer chipping	Use the site-specific drum-entry or maintenance procedure; apply effective ventilation, dust capture, or wet methods where feasible.	Evaluate exposure; use respiratory protection when required; follow confined-space, lockout/tagout, and hearing-protection requirements as applicable.
Concrete cutting, grinding, drilling, or coring	Use the applicable OSHA construction Table 1 control when the task is covered, or use controls supported by an exposure assessment.	Use required respiratory protection and competent-person oversight for construction work.
Concrete demolition or jackhammering	Use continuous water delivery or an appropriate shroud and dust-collection system as applicable to the tool and task.	Establish controlled access; evaluate respiratory protection and nearby employee exposure.
Dust collector, baghouse, silo, or spill cleanup	De-energize and isolate equipment as required; use HEPA vacuuming or wet methods; minimize material disturbance.	Plan non-routine work with Safety; evaluate exposure and respiratory protection before entry or cleanup.