**County of Henrico**

**Crystalline Silica Safety Program and**

**Exposure Control Plan**



**Department: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Crystalline Silica Safety Program and**

**Exposure Control Plan**

# I. Purpose

This Silica Exposure Control Plan (ECP) was developed to minimize employee exposures to hazardous levels of Respirable Crystalline Silica through work activities or construction activities occurring on or near worksites. Respirable Crystalline Silica exposure at hazardous levels can lead to lung cancer, silicosis, chronic obstructive pulmonary disease, and kidney disease. This Plan intends to meet the requirements of the Respirable Crystalline Silica Construction Standard (29 CFR 1926.1153) and General Industry Standard (29 CFR 1910.1053) as established by Virginia Occupational Safety and Health (VOSH).

# II. Scope

This Silica Safety Program applies to all employees who have the potential to be exposed to respirable crystalline silica when performing tasks covered by the VOSH Standard. The Respirable Crystalline Silica Construction Standard applies to all occupational exposures to respirable crystalline silica in construction work, 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.

All work involving chipping, cutting, drilling, grinding, and/or similar activities on materials containing crystalline silica can release breathable particles of crystalline silica (i.e. Respirable Crystalline Silica). Crystalline silica is a basic component of soil, sand, granite and many other minerals. Quartz (SiO2) is the most common form of crystalline silica. Many materials found on constructions sites include crystalline silica; including but not limited to – cement, concrete, asphalt, pre-formed structures (inlets, pipe, etc.) and others. Consequently, this safety program has been developed to address and control these potential exposures to prevent Henrico County employees from illnesses related to respirable crystalline silica exposure.

The General Industry Standard for Respirable Crystalline Silica (29 CFR 1910.1053) covers exposure potentials that are not listed on Table 1 (pages 5-9). Such activities would include, but are not limited to, drywall work, paint removal and sanding surfaces with silica-containing materials.

# III. Responsibilities

All affected County of Henrico departments are responsible for implementing this Plan when it is necessary to protect employees from respirable crystalline silica exposure.

**Affected Departments will:**

* Conduct work-site Hazard Assessments for silica-containing materials to determine if work activities could exceed an employee’s exposure to levels above 25 μg/m3 during an 8-hour TWA under foreseeable condition(s).
* Select and implement the appropriate exposure control measures in accordance with the Construction Tasks identified in the Construction Standard Table 1 to include training, silica exposure monitoring, if needed, Hazard Communication training, if needed, medical surveillance, if needed, and housekeeping.

NOTE: The Construction Standard Table 1 lists eighteen common construction tasks along with acceptable exposure control methods and work practices that limit exposure for those tasks.

* Ensure machinery, materials, tools, equipment, personal protective equipment (PPE) and worker training meet the requirements of the Silica Exposure Control Plan (pages 19 and 20) are in place at the worksite.
* Ensure that Department Heads, site supervisors, competent persons, and employees understand the requirements of the Respirable Crystalline Silica Construction and General Industry Standard and Hazard Communication Standard.
* Maintain written or electronic records of all training, plus all updates to this Program, inspections (for equipment, PPE, and work methods/practices), medical surveillance records if applicable, respirator medical evaluations and fit-test results, if applicable.
* Document an annual review of the Safety Program, or more often as needed if conditions change. This includes a review of appropriate dust control technology to ensure appropriate technologies are selected and used when practical.
* Coordinate work with contractors whenever necessary to ensure a safe work environment relative to potential silica exposure.

## Site Supervisor will:

* Ensure all applicable elements of this safety program are implemented at the work site including the selection of a Competent Person.
* Conduct job site hazard assessments for silica containing materials and perform hazard assessments in order to determine if an ECP, exposure monitoring, and medical surveillance will be necessary.
* Assist in the selection and implementation of the appropriate control measures in accordance with the Construction Tasks identified in Construction Standard Table 1; and potentially including (but not limited to) - a written Exposure Control Plan (pages 19 and 20), exposure monitoring, Hazard Communication training, medical surveillance, housekeeping and others.
* Ensure that employees using respirators have been properly trained, medically cleared, and fit-tested in accordance with the County’s Respiratory Protection Program.
* Ensure that work is conducted in a manner that minimizes and adequately controls the risk to site workers and others. This includes ensuring that workers use appropriate engineering controls, work practices, and wear appropriate PPE at all times.
* Where there is risk of exposure to silica dust, verify employees are properly trained on the applicable contents of the ECP, any project-specific elements, and other applicable VOSH Standards (such as Hazard Communication).

## Competent Person will:

* Make frequent and regular inspections of the job/work site, materials, machinery, and equipment to implement the written ECP.
* Identify existing and foreseeable respirable crystalline silica hazards in the workplace and take prompt corrective measures to eliminate or minimize them.
* Notify the Department Head or his/her designee of any deficiencies identified during inspections in order to coordinate and facilitate prompt corrective action.
* Assist the Site Supervisor in conducting job site assessments for Silica containing materials and perform employee Respirable Crystalline Silica hazard assessments in order to determine if an ECP, exposure monitoring, and medical surveillance is necessary.

## Employees will:

* Follow recognized work procedures (such as the Construction Tasks identified in the Construction Standard Table 1) as established in this Safety Program.
* Use the assigned PPE in an effective and safe manner.
* Participate in respirable crystalline silica exposure monitoring and the medical surveillance program, if applicable.
* Report any unsafe conditions or acts to the Site Supervisor and/or Competent Person.
* Report any exposure incidents or any signs or symptoms of silica illness.

# IV. Definitions:

* **Action Level** a concentration of airborne Respirable Crystalline Silica of 25 μg/m3, calculated as an 8-hour Time Weighted Average (TWA).
* **APF 10** “Assigned Protection Factor”; an estimate of how much protection a respirator provides to the wearer. A protection factor of “10” means that no more than one-tenth of the contaminants to which the worker is exposed leak into the mask.
* **Competent Person** an individual who is capable of identifying existing and foreseeable Respirable Crystalline Silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them.
* **Employee Exposure** the exposure to airborne Respirable Crystalline Silica that would occur if the employee were not using a respirator.
* **High-Efficiency Particulate Air (HEPA) Filter** a filter that is at least 99.97 percent efficient in removing monodispersed particles of 0.3 micrometers in diameter.
* **Objective Data** air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee exposure to Respirable Crystalline Silica associated with a particular product or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.
* **Permissible Exposure Limit (PEL)** an exposure that cannot exceed an airborne concentration of respirable crystalline silica over of 50 μg/m3, calculated as an 8-hour Time Weighted Average.
* **Physician or Other Licensed Health Care Professional (PLHCP)** an individual who is legally permitted by license, registration, or certification, to provide or some or all of the health care services required by the Medical Surveillance Section of the Respirable Crystalline Silica Standard.
* **Respirable Crystalline Silica** Quartz, Cristobalite, and/or Tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle size- selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality-Particle Size Fraction Definitions for Health-Related Sampling.

# V. REQUIREMENTS

Table 1: Specified Exposure Control Methods when

Working with Materials Containing Crystalline Silica

| **Construction Task or Equipment Operation** | **Engineering and Work Practice Control Methods** | **Required Respiratory Protection (APF 10)** |
| --- | --- | --- |
| **≤ 4 hours/shift** | **>4 hours/shift** |
| **1** | Stationary masonry saws | * Use saw equipped with integrated water delivery system that continuously feeds water to the blade.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
 | None | None |
| **2a** | Handheld power saws (any blade diameter) when used outdoors | * Use saw equipped with integrated water delivery system that continuously feeds water to the blade.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
 | None | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask |
| **2b** | Handheld power saws (any blade diameter) when used indoors or in an enclosed area | * Use saw equipped with integrated water delivery system that continuously feeds water to the blade.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
 | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask |
| **3** | Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less) for tasks performed outdoors only | * Use saw equipped with commercially available dust collection system.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
* Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.
 | None | None |
| **4a** | Walk-behind saws when used outdoors | * Use saw equipped with integrated water delivery system that continuously feeds water to the blade.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
 | None | None |
| **4b** | Walk-behind saws when used indoors or in an enclosed area | * Use saw equipped with integrated water delivery system that continuously feeds water to the blade.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
 | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask |
| **5** | Drivable saws for tasks performed outdoors only | * Use saw equipped with integrated water delivery system that continuously feeds water to the blade.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
 | None | None |
| **6** | Rig-mounted core saws or drills | * Use tool equipped with integrated water delivery system that supplies water to cutting surface.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
 | None | None |
| **7** | Handheld and stand-mounted drills (including impact and rotary hammer drills) | * Use drill equipped with commercially available shroud or cowling with dust collection system.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
* Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.
* Use a HEPA-filtered vacuum when cleaning holes.
 | None | None |
| **8** | Dowel drilling rigs for concrete for tasks performed outdoors only | * Use shroud around drill bit with a dust collection system.
* Dust collector must have a filter with 99% or greater efficiency and a filter cleaning mechanism.
* Use a HEPA-filtered vacuum when cleaning holes.
 | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask |
| **9a** | Vehicle-mounted drilling rigs for rock and concrete | * Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector.
 | None | None |
| **9b** | Vehicle-mounted drilling rigs for rock and concrete | * Operate from within an enclosed cab and use water for dust suppression on drill bit.
 | None | None |
| **10a** | Jackhammers and handheld powered chipping tools when used outdoors | * Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.
 | None | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask |
| **10b** | Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area | * Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.
 | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask |
| **10c** | Jackhammers and handheld powered chipping tools when used outdoors | * Use tool equipped with commercially available shroud and dust collection system.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
* Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.
 | None | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask |
| **10d** | Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area | * Use tool equipped with commercially available shroud and dust collection system.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
* Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.
 | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask |
| **11** | Handheld grinders for mortar removal (i.e., tuckpointing) | * Use grinder equipped with commercially available shroud and dust collection system.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
* Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.
 | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask | Powered Air-Purifying Respirator (PAPR) with P100 Filters |
| **12a** | Handheld grinders for uses other than mortar removal for tasks performed outdoors only | * Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
 | None | None |
| **12b** | Handheld grinders for uses other than mortar removal when used outdoors | * Use grinder equipped with commercially available shroud and dust collection system.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
* Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.
 | None | None |
| **12c** | Handheld grinders for uses other than mortar removal when used indoors or in an enclosed area | * Use grinder equipped with commercially available shroud and dust collection system.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
* Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.
 | None | N95 (or Greater Efficiency) Filtering Facepiece or Half Mask |
| **13a** | Walk-behind milling machines and floor grinders | * Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
 | None | None |
| **13b** | Walk-behind milling machines and floor grinders | * Use machine equipped with dust collection system recommended by the manufacturer.
* Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
* Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.
* When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.
 | None | None |
| **14** | Small drivable milling machines (less than half-lane) | * Use a machine equipped with supplemental water sprays designed to suppress dust.
* Water must be combined with a surfactant.
* Operate and maintain machine to minimize dust emissions.
 | None | None |
| **15a** | Large drivable milling machines (half-lane and larger) for cuts of any depth on asphalt only | * Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.
* Operate and maintain machine to minimize dust emissions.
 | None | None |
| **15b** | Large drivable milling machines (half-lane and larger) for cuts of four inches in depth or less on any substrate | * Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.
* Operate and maintain machine to minimize dust emissions.
 | None | None |
| **15c** | Large drivable milling machines (half-lane and larger) for cuts of four inches in depth or less on any substrate | * Use a machine equipped with supplemental water spray designed to suppress dust.
* Water must be combined with a surfactant.
* Operate and maintain machine to minimize dust emissions.
 | None | None |
| **16** | Crushing machines | * Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points).
* Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions.
* Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote-control station.
 | None | None |
| **17a** | Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials | * Operate equipment from within an enclosed cab.
 | None | None |
| **17b** | Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials | * When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.
 | None | None |
| **18a** | Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing silica-containing materials | * Apply water and/or dust suppressants as necessary to minimize dust emissions.
 | None | None |
| **18b** | Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing silica-containing materials | * When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.
 | None | None |

When implementing the engineering control measures specified in Table 1 above, affected Departments shall:

* Ensure that tasks performed indoors or in enclosed areas have a means of exhaust that minimizes the accumulation of visible airborne dust;
* Ensure that tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;
* For tasks that include an enclosed cab or booth, ensure that the enclosed cab or booth:
* Is maintained as free as practicable from settled dust;
* Has door seals and closing mechanisms that operate as designed at all times;
* Has gaskets and seals that are in good condition and working properly;
* Maintains positive pressure through a continuous delivery of fresh air;
* Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 μm range (e.g., MERV-16 or better); and
* Heating and cooling capabilities are available.
* Where an employee performs more than one task included on Construction Standard Table 1 during the course of a work shift, and the total duration of all tasks combined is more than four hours, respiratory protection as specified on Table 1 is required.

## VI. Alternative Exposure Control Methods

Alternative Exposure Control Methods shall apply for tasks not listed in VOSH’s Construction Standard Table 1, or where Departments cannot not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1.

First, Departments will assess the exposure of each employee who is or may reasonably be expected to be exposed to Respirable Crystalline Silica at or above the Action Level in accordance with either the Performance Option or the Scheduled Monitoring Option.

* **Performance Option** – Departments will assess the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to Respirable Crystalline Silica.
* **Scheduled Monitoring Option {if Necessary [(1926.1153(d)(2)(iii)]}:**
* If silica exposures are anticipated to be over the limit, affected Departments will arrange for initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, and in each work area. Where several employees perform the same tasks on the same shift and in the same work area, Departments will plan to monitor a representative fraction of these employees. When using representative monitoring, Departments will sample the employee(s) who are expected to have the highest exposure to Respirable Crystalline Silica.
* If initial monitoring indicates that employee exposures are below the Action Level, Departments may discontinue monitoring for those employees unless work processes change. When there has been a change, a new monitoring session may be needed.
* Where the most recent exposure monitoring indicates that employee exposures are at or above the Action Level but at or below the Personal Exposure Limit (PEL), Departments will repeat monitoring within six months of the most recent monitoring.
* Where the most recent exposure monitoring indicates that employee exposures are above the PEL, Departments will repeat such monitoring within three months of the most recent monitoring.
* When subsequent monitoring (non-initial) exposure monitoring indicates that employee exposures are below the Action Level, Departments shall repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the Action Level. At that time, Departments can discontinue monitoring for those employees whose exposures are represented by such monitoring, except when a reassessment is needed.
* Departments will reassess silica exposure risks whenever there is a change in work processes, engineering controls, and equipment that may indicate the need for new sampling results. Also, Departments may do additional sampling when there is reason to believe new or additional exposures are at or above the Action Level.

Departments will ensure that the monitoring of respirable crystalline silica levels is conducted by a qualified individual (i.e. a Certified Industrial Hygienist) and the samples are evaluated by a qualified laboratory with respect to crystalline silica analyses.

Within five working days after completing exposure monitoring, Departments will notify each affected employee in writing of the results of that assessment or post the results in a location accessible to all affected employees.

Whenever exposure monitoring indicates that employee exposures are above the PEL, Departments will describe in writing the corrective action being taken to reduce employee exposure to or below the PEL.

Where air monitoring is performed, Departments will provide affected employees or their representatives an opportunity to observe monitoring of employee exposures to respirable crystalline silica.

When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, Departments will provide observers with protective clothing and equipment at no cost and shall ensure the observers use such clothing and equipment.

Once air monitoring has been performed, Departments will determine its method of compliance based on the monitoring data and the hierarchy of controls. Departments will use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless Departments can demonstrate that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, Departments will nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them with the use of respiratory protection.

In addition to the requirements of this Plan, Departments will comply with other programs and VOSH Standards (such as 29 CFR 1926.57 [Ventilation]), when applicable where abrasive blasting is conducted using crystalline silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.

## VII. Control Methods

Departments will provide control methods that are either consistent with Table 1 or otherwise minimize worker exposures to silica. These exposure control methods include engineering controls, work practices, and respiratory protection. Control methods listed in Table 1 shall be used whenever possible. Departments that use a control method not listed in Table 1 shall outline the method in Appendix A and provided sampling data or other information to verify that no employee will be exposed to silica above the Action Level.

## VIII. Respiratory Protection

When tasks make respiratory protection mandatory, Departments will provide each employee with an appropriate respirator designed for protection from silica dust. Departments must comply with the requirements of the County’s Respiratory Protection Program and VOSH’s Respiratory Protection Standard (29 CFR 1910.134).

Respiratory protection is required where specified by the Construction Standard Table 1, for tasks not listed in Table 1, or where the company has not fully and properly implemented the engineering controls, work practices, and respiratory protection described in Table 1. Situations requiring respiratory protection include:

* Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;
* Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible; and
* During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL.

IX. Housekeeping

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

Departments shall not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:

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

## X. Exposure Control Plan Form (pages 19 and 20)

The Silica ECP form must be used in situations where employees may experience silica exposure at or above the Action Level. The ECP in this program contains these elements:

* A description of the tasks in the workplace that involve potential exposure to respirable crystalline silica;
* A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task;
* A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica; and
* A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to respirable crystalline silica and their level of exposure, including exposures generated by other employers or sole proprietors.

The written ECP will designate a Competent Person to make frequent and regular inspections of job sites, materials, and equipment to ensure that safe work practices are in place.

This Silica Exposure Control Plan should be reviewed at least annually to evaluate the effectiveness of it and update it as necessary. Having said this, ECP’s are project specific and most project durations do not exceed a year. The written ECP will be readily available for examination and copying, upon request, to each employee covered by this program and/or ECP, their designated representatives, and VOSH.

## XI. Medical Surveillance

Medical surveillance **shall be made available** for each employee who uses a respirator for 30 or more days per year due to his/her Respirable Crystalline Silica exposure. Medical surveillance (i.e. medical examinations and procedures) will be performed by Henrico County Employee Health or another qualified PLHCP and provided at no cost to the employee at a reasonable time and place.

Departments will make available an initial (baseline) medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of the Respirable Crystalline Silica Construction Standard within the last three years. The exam shall be offiered every three years after the initial exam if the worker is still required to wear a respirator for 30 days or more per year under the standard. The examination shall consist of:

* A medical and work history, with emphasis on past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system in addition to any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing), history of tuberculosis, and smoking status and history;
* A physical examination with special emphasis on the respiratory system;
* A chest X-ray (a single postero-anterior 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) and interpreted by a qualified professional;
* A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;
* Testing for latent tuberculosis infection; and
* Any other tests deemed appropriate by Employee Health or a qualified PLHCP.

Departments will make available medical examinations that include the aforementioned procedures (except testing for latent tuberculosis infection) at least every three years. If recommended by Employee Health or the PLHCP, periodic examinations can be more frequently than every three years.

Departments will ensure that Employee Health or the PLHCP, if requested, has a copy of the Respirable Crystalline Silica Construction Standard, this program, and the following information:

* A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;
* The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;
* A description of any personal protective equipment (PPE) used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and
* Information from records of employment-related medical examinations previously provided to the employee and currently within the control of Henrico County.

Affected Departments will ensure Employee Health or the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:

* A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;
* Any recommended limitations to the employee's use of respirators;
* Any recommended limitations on the employee's exposure to respirable crystalline silica; and;
* A statement that the employee should be examined by a specialist if the chest X-ray is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by Employee Health or the PLHCP.

Affected Departments will also obtain a written medical opinion from Employee Health and/or the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following in order to protect the employee’s privacy:

* The date of the examination;
* A statement that the examination has met the requirements of the respirable crystalline silica Construction Standard; and
* Any recommended limitations on the employee's use of respirators.

If the employee provides written authorization, the written opinion shall also contain either or both of the following:

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

If Employee Health or the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, Departments will make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion. Departments will ensure the specialist has all information the County must provide to the PLHCP.

Affected Departments will ensure any specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination. The written report will contain:

* A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;
* Any recommended limitations on the employee's use of respirators; and
* Any recommended limitations on the employee's exposure to respirable crystalline silica.

In addition, Departments will obtain a written opinion from the specialist within 30 days of the medical examination. The written opinion shall contain the following:

* The date of the examination;
* Any recommended limitations on the employee's use of respirators; and
* If the employee provides written authorization, the written opinion shall also contain any recommended limitations on the employee's exposure to respirable crystalline silica.

## XII. Hazard Communication

Departments will include respirable crystalline silica in the company’s Hazard Communication Program established to comply with the VOSH Hazard Communication Standard (29 CFR 1910.1200).

Departments will ensure that each employee has access to labels on containers of crystalline silica and those containers respective Safety Data Sheets (SDSs).

All employees will be trained in accordance with the provisions of the Hazard Communication Standard and the training section of this program. This training will cover concerns relating to cancer, lung effects, immune system effects, and kidney effects.

Departments will ensure that each employee with the potential to be exposed at or above the Action Level for respirable crystalline silica can demonstrate knowledge and understanding of at least the following:

* The health hazards associated with exposure to respirable crystalline silica;
* Specific tasks in the workplace that could result in exposure to respirable crystalline silica;
* Specific measures affected Departments have implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
* The contents of the Respirable Crystalline Silica Construction Standard;
* The identity of the Competent Person designated by each Department; and
* The purpose and a description of the company’s Medical Surveillance Program.

Departments will make a copy of the Respirable Crystalline Silica Construction/General Industry Standard readily available without cost to any employee who requests it.

## XIII. Recordkeeping

Departments will make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica. This record will include at least the following information:

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

Departments will ensure that any exposure records are maintained and made available in accordance with 29 CFR 1910.1020. Exposure records will be kept for at least 30 years.

The employer shall make and maintain an accurate record of all objective data used to comply with the requirements of the Standard(s). This record shall include at least the following information:

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

Departments will ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020. Objective data records will be kept for at least 30 years.

Departments will maintain accurate records for each employee enrolled in the Medical Surveillance portion of this Silica Program. The record shall include the following information about the employee:

* Name and employee number;
* A copy of the PLHCPs' and/or specialists' written medical opinions; and
* A copy of the information provided to the PLHCPs and Specialists.

Departments will ensure that medical records are maintained and made available in accordance with 29 CFR 1910.1020. Medical records will be kept under lock and key for at least the duration of employment plus 30 years. It is necessary to keep these records for extended periods because Silica-related diseases such as cancer often cannot be detected until several decades after exposure. However, if an employee works for an employer for less than one year, the employer does not have to keep the medical records after employment ends, as long as the employer gives those records to the employee.

# XIV. Program Evaluation

This program will be reviewed and evaluated on an annual basis by each affected Department unless changes to operations, the Respirable Crystalline Silica Standards (29 CFR 1910.1053 and 29 CFR 1926.1153), or another applicable Standard require an immediate re-validation of this program.

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| **Silica Exposure Control Plan (Page 1 of 2)** |
| **Department:** |  | **Date:** |  |
| **Person Completing this Document:** |  |  |  |
| **Competent Person:** |  |  |  |
| **Job Site/Location:** |  |  |  |
|  |
| **Description of Task(s):** |  |
|  |  |
|  |
| **Engineering Controls:** |  |
|  |  |
|  |
| Any deviation from Table 1 = air monitoring is required. Engineering controls must be used at all times!(Wet methods, continuous water feed, local exhaust ventilation w/ HEPA filters, commercially available shrouds, commercial dust collection system, cyclone pre-separator/filter cleaning system, surfactant used, and ventilation ≥ 25 cfm/inch of wheel diameter, enclosed cab w/ fresh climate-controlled air to operator, employees outside of cabs applying water/dust suppressants, equipment maintained to minimize dust emissions.) |
| **Work Practices:** |  |
|  |  |  |  |
|  |  |  |  |
| (Maintain equipment functionality – cleaned/spare filters, hoses to start; good connections; hoses with no holes, kinks, permanent bends, crushed; power source available; water source available, ensure ventilation is ≥ 25 cfm/inch of wheel diameter; water/exhaust ventilation lines safe from damage; shrouds/cowls fit correctly and not damaged; follow Manufacturer’s instruction for filter cleaning/change out). |

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| **Silica Exposure Control Plan (Page 2 of 2)** |
| **Respiratory Protection:** |  |
|  |  |
|  |
| (Use respirator with APF = 10 the entire time the task is being performed – See Table 1 of the Construction Standard)For tight-fitting respirator wear, the Henrico County Respiratory Protection Plan must be implemented for affected employees. This includes: selection of appropriate respirator, employee training and fit testing, and proper use and wearing (i.e., no facial hair interfering with the respirator sealing surface). |
| **Housekeeping:** |  |
|  |  |
|  |
| (Dust containing silica on work surfaces/equipment must be removed using wet methods of HEPA-equipped vacuum**, no use of compressed air or dry sweeping** for removing dust and debris containing silica, dispose of used vacuum bags in a closed sealed container).  |
| **Objective Data\* Use:** (optional) – **Yes** or **No** |
|  | Data Source:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Data conditions from source matched work site conditions: **Yes** or **No** **\*Objective Data**: this is air monitoring data from established industry survey or calculations that shows there is, or will be, employee exposure to Respirable Crystalline Silica associated with using a specific product or material, or doing a specific task or activity. The data must reflect the workplace conditions Henrico County employees will experience while doing their assigned tasks and the environmental conditions present in the department's current operations. |