

## 1.1 PURPOSE

1.1.1 The purpose of this policy is to reduce TERRY R PITT CONSTRUCTION worker exposure to airborne crystalline silica below the PEL by means of effective controls. For the purposes of this policy, TERRY R PITT CONSTRUCTION refers to crystalline silica in a respirable form.

## 1.2 RESPONSIBILITIES

### 1.2.1 TERRY R PITT CONSTRUCTION

1.2.1.1 Determine if silica is present on a project and, if so, inform potential contractors.

1.2.1.2 Take all reasonable precautions to protect the health and safety of workers. Provide information, instruction, and supervision to protect worker health and safety.

1.2.1.3 Ensure that equipment, materials, and PPE are maintained in good condition.

1.2.1.4 Acquaint a worker or a person in authority over a worker with any hazard in the work and in the handling, storage, use, disposal, and transport of any article, device, equipment, or a biological, chemical, or physical agent.

1.2.1.5 Evaluate the written exposure control plan at least once per year and as necessary. Situations where reevaluation may be necessary include regulatory updates, changes in equipment, and exposure incidents.

1.2.1.6 Make written plan available for examination and copying by employees. Copies may be available electronically or physically, depending on location needs.

1.2.1.7 Maintain accurate records of all air monitoring data, objective data, and medical surveillance as required by the regulation.

### 1.2.2 Employees

1.2.2.1 Know the hazards of silica dust exposure

1.2.2.2 Work in accordance with the project specific procedures and use the assigned protective equipment in an effective and safe manner

1.2.2.3 Report any hazards to their supervisor immediately

## 1.3 HEALTH EFFECTS

1.3.1 The prolonged inhalation of respirable dust containing crystalline silica may result in silicosis, a disease characterized by progressive fibrosis of the lungs, lung cancer, pulmonary tuberculosis, and other diseases of the lungs. A pneumoconiosis (lung disease caused by the inhalation of dust), silicosis is marked by shortness of breath and impaired lung function that may give rise to complications that can result in death.

- 1.3.1.1 The development and the severity of silicosis depends on the airborne concentration of silica dust to which a worker is exposed and the duration of exposure.
- 1.3.2 Crystalline silica may be harmful following high exposure levels received over a period, ranging from a few weeks to years, or after long-term exposures to lower levels. There are three major types of silicosis: chronic, accelerated, and acute.
- 1.3.3 Chronic silicosis symptoms may not appear for a long time, usually more than 10 years and may progress and worsen over a period of many years.
- 1.3.4 The effects of silicosis can continue to develop even after the exposure ceases, and they are irreversible. The progression of lung fibrosis can also lead to the development of lung cancer.
- 1.3.5 Simple silicosis is almost entirely without symptoms. In the early stages of the disease, the lung nodules are small and discreet in the upper lung fields. As the disease progresses the nodules increase in number and size and also occupy the lower field. Although simple silicosis may never grow more serious, long-term exposure to silica dust may lead to complicated silicosis.
- 1.3.6 Complicated chronic silicosis is also called progressive massive fibrosis. The first symptoms may be shortness of breath with exercise, wheezing, or sputum that causes coughing. Some people have no symptoms. Severe complicated silicosis can result in heart disease in addition to lung disease.
- 1.3.7 Accelerated silicosis is almost the same as chronic silicosis. However, it develops more quickly and the lung scars show up sooner. Accelerated silicosis can develop when exposure to large amounts of silica dust occurs over a short time period. Nodules may appear on a chest x-ray five years after the first exposure to silica dust and the disease can quickly worsen.
- 1.3.8 Acute silicosis is a lung disease that develops rapidly. As few as 8 to 18 months may elapse from the time of first exposure to the onset of symptoms, which include progressive shortness of breath, fever, cough, and weight loss. There is a rapid progression of respiratory failure usually resulting in death within one or two years.

## 1.4 OCCUPATIONAL EXPOSURE

- 1.4.1 Occupational exposure to silica occurs through inhalation of small airborne particles of silica dust, mainly in the range of 5.0  $\mu\text{m}$  to 0.5  $\mu\text{m}$ , which are not expelled from the lung when inhaled. Instead, they remain in the lung and are deposited in lymph nodes, where over time, calcium can deposit in those nodes and settle along the rim of the lymph node. This condition is known as *eggshell* calcification. In some cases, silica particles are carried into the lungs where a scar may form around the particles. Over time, the hardened scars gradually start to show up on the chest x-ray as fibrosis of the lung.
- 1.4.2 In construction, worker exposure to silica is of particular concern because silica is the primary component of many construction materials. Some commonly used construction materials containing silica include:
  - 1.4.2.1 Abrasives used for blasting, brick, refractory brick, concrete, concrete block, cement, mortar, granite, sandstone, quartzite, slate, gunite, mineral deposits, rock and stone, sand, fill dirt, topsoil, and asphalt containing rock or stone.

- 1.4.3 Many construction activities can generate airborne silica-containing dust. Abrasive blasting generates the most dust. Exposure to silica from abrasive blasting can result if the abrasive contains silica and/or if the material being blasted contains silica. Other activities that generate airborne dust include:
  - 1.4.3.1 Chipping, hammering, and drilling of rock
  - 1.4.3.2 Crushing, loading, hauling, and dumping of rock
  - 1.4.3.3 Sawing, hammering, drilling, grinding, and chipping of concrete or masonry structures
  - 1.4.3.4 Demolition of concrete and masonry structures
  - 1.4.3.5 Dry sweeping or pressurized air blowing of concrete, rock, or sand dust
  - 1.4.3.6 Road construction
  - 1.4.3.7 Sweeping, cleaning, and dismantling equipment
  - 1.4.3.8 Tunneling, excavation, and earth moving of soils with high silica content

## 1.5 CONTROLS

- 1.5.1 In order for silica to be a hazard, silica containing dust particles that are small enough to be inhaled (ex. respirable) must get into the air. The strategy for controlling the silica hazard can therefore be broken down into three basic approaches:
  - 1.5.1.1 Prevent silica dust from getting into the workplace air
  - 1.5.1.2 Remove silica dust present in the air
  - 1.5.1.3 If present, prevent workers from inhaling the dust
- 1.5.2 Engineering and work practice controls must be used to reduce employee exposure to respirable crystalline silica to the lowest feasible level and maintain it at that level when required. Engineering controls are methods of designing or modifying equipment, ventilation systems, and processes to minimize the amount of a substance that gets into the workplace air.
- 1.5.3 Substitution can eliminate silica from certain processes by replacing it with a less toxic material.
- 1.5.4 When it is not possible to use a silica substitute, changing how a process is performed can lower silica exposures. Wet methods reduce dust and should be used whenever practical in cutting, grinding, and drilling operations. Modify an abrasive operation to produce a coarser dust that is less hazardous because it settles more readily and is less likely to be trapped in the lungs if inhaled.
- 1.5.5 Warning signs should be posted in sufficient numbers to warn of the hazard. If it is an indoor operation, signs should be posted at each entrance to the work area. The signs should display the following information in large, clearly visible letters:

DANGER – AUTHORIZED PERSONNEL ONLY  
SILICA DUST HAZARD  
PROPER RESPIRATORY PROTECTION MUST BE WORN

- 1.5.6 The generation of airborne silica containing dust above the PEL should be controlled with a mechanical ventilation system, wetting, or the use of a dust collection system. If silica containing airborne dust is generated, mechanical ventilation with airflow sufficient to remove airborne contaminants from workers' breathing zones should be provided. The airflow of the mechanical ventilation system should be at least 50 cubic feet per minute per square foot of face area. If it is determined that none of these methods are practical, workers may be provided with respirators to protect them from exposure.
- 1.5.7 Dusty operations can be isolated by carrying them out in areas that are physically separated from non-dusty areas and keeping workers not involved in the operation out of the area. Where isolation is not effective, the process can be completely sealed off from the rest of the worksite.
- 1.5.8 The most effective use of ventilation to control a silica hazard is the removal of dust at its source (local exhaust ventilation). Often dust-generating tools are equipped with dust collection systems to prevent dust from spreading or becoming airborne. An essential component of a dust collection system is a cleaning device, such as a filter, which will effectively remove the dust.
- 1.5.9 Barriers, partial enclosures, and full enclosures are used to separate the work area from the rest of the project and in some cases, to prevent silica exposure to other workers not directly involved in the operation. Partial and full enclosures can also prevent or reduce the dispersion of silica into the surrounding work area and environment. Barriers should only be used where full and partial enclosures are not practicable.
- 1.5.9.1 Ropes or barriers do not prevent the release of contaminated dust or other contaminants into the environment. However, they can be used to restrict access of workers who are not adequately protected with proper PPE and also prevent the entry of workers not directly involved in the operation.
- 1.5.9.2 Ropes or barriers should be placed at a distance far enough from the operation that allows the silica containing dust to settle. If this is not achievable, warning signs will be posted at the distance where the silica containing dust settles to warn that access is restricted to persons wearing PPE. All workers within the barrier or warning sign zone must be adequately protected.

## 1.6 PERSONAL PROTECTIVE EQUIPMENT

- 1.6.1 The purpose of protective clothing is to prevent the contamination of regular clothing and the transportation of silica containing materials from the worksite. Clothing that is contaminated with silica dust should not, therefore, be worn home without cleaning.
- 1.6.2 TERRY R PITT CONSTRUCTION will issue PPE such as gloves, coveralls, respiratory equipment, and eye protection to affected employees. PPE should be used and worn appropriately to control silica exposures.



- 1.6.3 Sometimes engineering controls and work practices cannot lower the concentration of silica to non-hazardous levels and workers must wear respirators for protection.
- 1.6.4 Workers should be instructed and trained on the care and use of PPE before using it. Some workers may have a medical condition that causes them to have difficulty breathing when wearing a respirator. Such workers should not be assigned to do work that requires a respirator if they have written medical proof of their condition.
- 1.6.5 Respirators are provided to employees who are or will be exposed to actionable levels of respirable crystalline silica.
  - 1.6.5.1 If an employee is performing a task listed in Table 1 of 1926.1153 (c) that does not require the use of a respirator, then they are not required. All other tasks not covered by Table 1 must be accounted for by providing respirators, if necessary.
- 1.6.6 Respirators with a tight-fitting face piece must be fitted to the worker in such a way that there is an effective seal between the equipment and the worker’s face.
- 1.6.7 Where respirators are provided, they should be appropriate in the circumstances for the type and the concentration of airborne silica. Respirators should be selected in accordance with NIOSH assigned protection factors. Respirators will be selected based on measured exposure levels of workers and the assigned protection factor (APF) of the respirators.
- 1.6.8 Where effective dust control measures are in place and where an employer can demonstrate on a continual basis that the silica exposure levels are below the PEL, respirators may not be required.

## 1.7 HYGIENE AND HOUSEKEEPING

- 1.7.1 Housekeeping measures used to limit exposure to respirable crystalline silica can include vacuuming, sweeping, wetting, and other techniques used to limit the amount of respirable crystalline silica exposure during housekeeping activities. It is important to follow good work and hygiene practices when silica is present.
- 1.7.2 Workers should therefore be able to wash and shower at the end of each shift. There should be no smoking, eating, drinking, or chewing in contaminated areas and lunches should be stored in an uncontaminated area.
- 1.7.3 Good housekeeping is important wherever silica dust is generated. Containers of silica containing waste should be kept tightly covered to prevent dust from becoming airborne.
- 1.7.4 Surfaces should be kept clean by washing down with water or vacuuming with a vacuum equipped with a high-efficiency particulate air (HEPA) filter. Avoid cleaning with compressed air or dry sweeping.
- 1.7.5 Clean up after each operation is encouraged to prevent dust-containing silica from spreading.
- 1.7.6 Compressed air or dry sweeping should be avoided when cleaning a work area.
- 1.7.7 Compressed air should not be used for removing dust from clothing.

- 1.7.8 Workers exposed to silica should be provided with or have access to washing facilities equipped with clean water, soap, and individual towels.
- 1.7.9 Silica dust on personal protective clothing and equipment should be removed by damp wiping or HEPA vacuuming.
- 1.7.10 Contaminated personal protective clothing and equipment should be handled with care to prevent disturbing the silica dust and the generation of airborne silica dust.
- 1.7.11 Washing and laundering facilities must be suitable for handling silica-contaminated laundry.

## 1.8 MONITORING

- 1.8.1 The presence of crystalline free silica in workplace air can be detected and measured using sophisticated techniques. These are often needed when the potential for dust production exists. TERRY R PITT CONSTRUCTION will conduct appropriate exposure monitoring that is representative of affected employee exposure to respirable crystalline silica.
- 1.8.2 If dust containing crystalline free silica can be seen, an exposure problem is likely to exist. It should be remembered that respirable dust, which is only a portion of the total dust, cannot actually be seen by the unaided eye. If airborne dust can be seen, a problem is likely to exist. The procedures for monitoring, sampling, and determining the concentrations of airborne silica at the worksite and a worker's exposure to airborne silica must be in accordance with standard methods for workplace air sampling and analysis.
- 1.8.3 The program includes planned air monitoring of worker exposure. The exposure of each employee who is or is expected to be exposed to respirable crystalline silica at or above the action level (8-hour TWA of  $25\mu\text{g}/\text{m}^3$ ) will be assessed. This assessment can be performed by monitoring employees individually or taking a representative sample from employees. Results must be posted in a conspicuous place within the plant and provided to the joint health and safety committee.
- 1.8.4 In addition, records of individual exposure, which include calculated 40-hour time weighted averages, must be retained. These should be representative of actual exposure.
- 1.8.5 These results provide a profile of actual worker exposure prior to and following establishment of the control program. The air monitoring strategy is designed to obtain results from all workers who are exposed to silica.

## 1.9 MEDICAL SURVEILLANCE

- 1.9.1 Even with appropriate measures to control silica, some workers may still be affected. For this reason, periodic medical examinations are important for determining if the control measures in place are effective and if workers are suffering from any of the effects of silica exposure. This is known as medical surveillance and can be considered to be a method of early detection and prevention of silicosis.
- 1.9.2 A medical surveillance program is established for employees who are exposed to the action level of 8-hour TWA of  $25\mu\text{g}/\text{m}^3$  of respirable crystalline silica. A baseline medical assessment must be available

to exposed employees within 30 days of initial assignment unless they have previously received a suitable medical examination in the past three years.

- 1.9.2.1 This applies to employees who would be required to wear a respirator more than 30 days/year or be exposed to action level respirable crystalline silica for more than 30 days per year. A suitable prescreen that meets the same requirements is also acceptable.
- 1.9.3 Medical surveillance can be used as a preventive and remedial measure. By providing regular medical examinations and clinical tests on workers exposed to silica, subsequent adverse health effects can be detected. The examining physician can then alert the worker, the employer, and the joint health and safety committee to exposure problems in the workplace that might otherwise go unrecognized. This should ensure that remedial steps are taken.
- 1.9.4 Workers working with silica on a regular basis should have pre-placement medical examinations that include chest x-rays and pulmonary function tests, followed by periodic medical examinations. The frequency of the periodic examination will depend on the intensity and length of exposure to silica and will be decided by the examining physician. It need not be the same for all workers but will be done at least once every two years.

## 1.10 TRAINING

- 1.10.1 A training program is provided for all employees who are exposed to action level respirable crystalline silica. Training is required prior to using silica containing materials or working in an environment known to contain airborne concentrations of silica. Employees whose work involves using materials that contain silica or environments where employees could be exposed to silica will be trained at the time of their initial assignment. Training will ensure that employees covered by the plan can demonstrate knowledge and understanding of:
  - 1.10.1.1 Information about the health hazards, potential health effects, and symptoms of exposure to respirable crystalline silica
  - 1.10.1.2 Specific tasks in the workplace that could result in exposure and specific measures taken to protect employees from exposure
  - 1.10.1.3 Safety data sheets for silica, quartz, and applicable products containing silica
  - 1.10.1.4 Purpose and set up of regulated areas marking boundaries of work areas containing silica dust
  - 1.10.1.5 Discussion of the importance of substitution, engineering controls, work practices, good housekeeping, and personal hygiene in reducing crystalline silica exposure
  - 1.10.1.6 Use and care of appropriate PPE, including respirators
  - 1.10.1.7 Expected exposures, controls in place to minimize exposure, and how to set up, use, and maintain the controls to be used
  - 1.10.1.8 Contents of this safety policy and procedure and the respirable crystalline silica rule

- 1.10.1.9 Proper hygiene and housekeeping
- 1.10.1.10 Availability of air monitoring and medical surveillance results
- 1.10.1.11 Use, care, maintenance, cleaning, and disposal of personal respiratory protection
- 1.10.2 Training will be delivered to employees through a variety of means, including new hire orientation, site-specific orientations, equipment and task specific training, safety meetings, and periodic refresher training.
- 1.10.3 All training will be documented.

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