



## **HSE BEST PRACTICES - SILICA PROTECTION**

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## 1.0 PURPOSE

The purpose of this document is to provide industry best practices for various high risk Silica tasks. It is the intent of the Alberta Construction Association to distribute this to all members in order to be used to reduce exposure to Silica.

All tasks listed below should have a Silica Code of Practice completed for each task.

## 2.0 TRAINING

Everyone involved in tasks that produce airborne silica dust, including Project Managers, Foremen, Superintendents, and workers must receive training before being assigned work. Training should address:

- How to follow a Silica Exposure Code of Practice;
- Identifying the materials and tasks that create silica hazards;
- A description of dust-generating tasks that will be undertaken and how the employer plans to control the dust (the silica Code of Practice);
- The health risks;
- Working safely with silica, including proper use of controls, protective clothing, and appropriate hygiene practices;
- How to follow a Respiratory Protection Code of Practice.

Supervisors and others responsible for health and safety must also receive training on how to implement the Silica Exposure Control plan and the Respiratory Protection Code of Practice.

## HEALTH ASSESSMENT<sup>1</sup>

Since there is no cure for silicosis, early detection is very important. Exposure should be minimized or eliminated if health effects are discovered. The silica-exposed worker must undergo a health assessment to provide a baseline health evaluation so that early changes to the lungs can be more easily detected.

A health assessment for silica-exposed workers consists of health history information, a chest x-ray, a radiologist's report, a lung function test and a physician's written interpretation and explanation of the assessment results.

The history includes identifying the worker, the employer, the worker's previous work and non-work exposure to crystalline silica or other dusts, indications of any existing respiratory disease, smoking history and the date on which the worker had his or her most recent chest x-ray or lung function test.

The chest x-ray consists of a single back to front (postero-anterior) view of the chest. The x-ray should be interpreted by a radiologist and the resulting report sent to a physician. Digital imaging format of x-ray is being used by some radiologists. Digital imaging can be used to meet the

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<sup>1</sup> [Alberta Occupational Health and Safety Bulletin: CH059 – Chemical Hazards. Revised November 2009](#)

requirements in the Occupational Health and Safety (OHS) Code provided the imaging facility is able to print to film when requested.

The lung function test, also called pulmonary function test, is done by a pulmonary function technician and involves measuring the volume capacity of lungs and the rate of air flow out of the lungs. The employer is responsible for ensuring that an exposed worker has a health assessment at no cost to the worker. A health assessment should be done within 30 days of a worker becoming an exposed worker (as defined in the legislation) and should be done every two years thereafter. Information in the health assessment is confidential and persons having custody of the information should ensure that it is kept confidential. <sup>2</sup>

#### **4.0 GENERAL TASKS**

The general tasks listed below have recommended practices which the Alberta Construction Association has identified to reduce potential exposure to airborne respirable silica dust. As a member of this Association, we encourage our members to follow any of these recommendations or implement more stringent Practices to protect each Member's work force from the harmful effects of Silica.

##### **Silica areas**

It is recommended that signs are posted clearly indicating that:

- Silica is present in the area;
- Only authorized persons may enter the area, and;
- Eating, drinking and smoking are prohibited in the area.

Posted signs should:

- Be placed by the contractor working with Silica based hazards and monitored by the General and/or Prime Contractor;
- Be in a conspicuous location at access/egress locations and on the periphery of each hazardous area, as appropriate, and;
- Remain posted until the area is no longer a hazardous area.

Other general recommendations may include:

- Do not use compressed air to blow out any dust from clothing.
- Providing workers in a Silica area with protective clothing that protects street clothing worn by the worker from silica contamination;
- Vacuuming work clothes regularly as dirt and silica will accumulate onto work clothes;
- Use of clean/dirty area restrictions and containment as needed, based on hazard assessments, so that workers' street clothing is not contaminated by silica;
- Educating and communicating to workers the hazards of leaving a work site until the worker's protective clothing has been removed;
- If reusable clothing is provided to the worker, a clean area is required to change in and out of street clothing and a procedure required to either clean such clothing or replace it;

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<sup>2</sup> Alberta Occupational Health and Safety Bulletin: [ppe001](#) – Respiratory Protective Equipment: An Employer's Guide

- There should be a way to seal this clothing as well as procedures to open the bins and launder the soiled clothing;
- It is not the worker's responsibility to launder work clothing.

## **5.0 SWEEPING FLOORS/DUST CONTROL**

Sweeping tasks will vary based on the work area, the dust/dirt levels on the surface in question, and whether indoors or outdoors. Being outdoors does not mitigate exposure to Silica and in fact may increase exposure (i.e. dirt roads combined with wind and/or activities around the work site). The following options may include:

- Mopping floors or wet sweeping and disposing of the water, if water is readily available;
- Use of a sweeping compound along with a properly fitted appropriate Respiratory Protection Equipment, (suggest a half mask respirator with P100 filter or P100 paper respirator) based on your company's Respiratory Code of Practice;
- Methods to properly bag the dust remains should be in place along with a properly fitted appropriate Respiratory Protection (see above);
- Use of a High Efficiency Particulate Air HEPA vacuum with a properly fitted appropriate Respiratory Protection Equipment (see above), based on your company's Respiratory Code of Practice;
- Procedures to maintain the vacuum and change the filters should be in place and documented;
- Considering the use of water misting/atomizers whenever possible to control dust.

Under no circumstances shall a compressor be used to blow around dust or be used to clean off a worker's clothing.

## **6.0 MAINTENANCE OF ACCESS ROADS**

Roads used in construction are often unpaved. In these cases, the following is recommended:

- The cabs of all equipment within the area should have a positive ventilation system and filtration unit with the cabs and windows of such vehicles should be shut during operation;
- Maintenance of filters/ventilation systems must follow manufacturer's specifications;
- Wet spraying of all dirt roads on the construction site, with particular attention to generally windy work areas. More attention will be required on busy dirt and gravel construction roads;
- Other spraying methods (i.e. oil/chemical spraying) may also be used, ensuring that any new hazards are controlled as per the SDS/MSDS.

## **7.0 CRUSHING, LOADING, HAULING AND DUMPING OF ROCK/GRAVEL/SAND**

A high level of exposure exists with any of these activities. These may require the following:

- Consider the use of wet water (or oil/chemical) spraying to control dusty areas;

- The cabs of all equipment within the area should have a positive ventilation system and filtration unit with the cabs and windows of such vehicles should be shut during operation;
- Maintenance of filters/ventilation systems must follow manufacturer's specifications;
- Loads must be covered and may also need water misting for longer hauls;
- Work area may need water misting to reduce dust for non-operators.

## 8.0 EXCAVATION/TUNNELING WORK

Although mainly an outdoor/underground activity, these tasks vary in exposure levels to respirable silica but usually create dust that could cause exposure. The following are recommended:

Excavations:

- The cabs of all equipment (including passenger trucks) within the area should have a positive ventilation system and filtration unit with the cabs and windows of such vehicles should be shut during operation;
- Maintenance of filters/ventilation systems must follow manufacturer's specifications;
- Loads must be covered and may also need water misting for longer hauls;
- Based on the hazard assessment, workers within the work area, outside of sealed machinery, may require appropriate respirators and filters;
- Work area may need water misting to reduce dust for non-operators;

Tunneling:

- The cabs of all equipment (including passenger trucks) within the area should have a positive ventilation system and filtration unit with the cabs and windows of such vehicles should be shut during operation;
- Maintenance of filters/ventilation systems must follow manufacturer's specifications;
- Tunnel ventilation system must be set up to move air as per legislation;
- Confined Space requirements, Emergency response procedures and air monitoring are required;
- Based on the hazard assessment, workers within the work area, outside of sealed machinery, may require appropriate respirators and filters;
- Loads must be covered and may also need water misting for longer hauls;

## 9.0 INTERIOR DEMOLITION

May create high levels of exposure, generating dust, silica and asbestos requiring a thorough Building Hazardous Materials Hazard Assessment and additional Codes of practice. Some, but not all, are recommended for interior demolition:

- Create an enclosed area;
- Signage indicating Demolition area – Hazardous Area
- Wet cut whenever possible;
- Dry cut as a secondary method, with the use of appropriate Respiratory Protection Equipment (suggest a half mask respirator with P100 filter or P100 paper respirator), based on your company's Respiratory Code of Practice;

- Ensure housekeeping is maintained throughout the work shift;
- Use Wet Dust Suppression and/or;
- Restrict/isolate work area and set up signage;
- Ventilation with filtration can be used to discharge dusty air to an outdoor unoccupied space;
- Removal of materials should be taken to approved facilities;
- Attention to clothing requirements/procedures mentioned in section 4.0;
- Schedule tasks after hours.

## **10.0 EXTERIOR DEMOLITION**

Regardless of outdoor conditions, demolition exposes both the worker and the surrounding areas to Silica levels that have been known to exceed limits. As with all demolition, this requires a thorough Building Hazardous Materials Hazard Assessment and an additional Codes of Practice. The recommendations are similar to hauling outdoors or excavating, but also require:

- Signage indicating Demolition area – Hazardous Area
- Water/oil or chemical spraying of demolition area;
- The cabs of all equipment within the area should have a positive ventilation system and filtration unit with the cabs and windows of such vehicles should be shut during operation;
- Maintenance of filters/ventilation systems must follow manufacturer's specifications;
- Loads must to be covered (e.g. tarps) and may also need water misting for longer hauls;
- Removal of materials should be taken to approved facilities;
- Schedule tasks after hours, if practicable.

## **11.0 ABRASIVE BLASTING**

Regardless of the abrasive material used (Silica versus substituted low/non-Silica product); this task may create high levels of airborne respirable silica. The recommendations will vary based on blasting type (permanent or temporary) and may require more than listed here. Key points for blasting are:

- Code of practice to identify hazards, blasting medium used and ensure all controls are in place;
- Refer to SDS / MSDS of the product(s) being used and/or worked with;
- Consider substitution to wet blasting, dry ice or shell techniques;
- Restrict access to prohibited area;
- Enclose work area with temporary or permanent hoods/hoardings/tents;
- Signage indicating Hazardous Area
- Ensure housekeeping is maintained throughout the work shift;
- Use of appropriate respiratory equipment. This may include appropriate Respiratory Protection Equipment (supplied-air respirator equipped with a hood or helmet and operated in a continuous-flow mode. For example, type CE abrasive-blasting respirators operated in the continuous-flow mode), based on your company's Respiratory Code of Practice. Blasting hoods do not provide adequate protection;
- Appropriate clean up of all materials to an approved facility;
- Schedule tasks after hours, if practicable.

## 12.0 CONCRETE MIXING PLANTS OR LARGE MIXERS

A high level of exposure exists when setting up temporary concrete mixing plants or large mixers.

NOTE: This practice is only intended for temporary construction items. For information on Concrete batch plants, please consult the plant's practices.

For temporary construction mixing plants/mixers, you should include the following:

- Refer to SDS / MSDS of the products being used;
- Create an enclosed or partially enclosed area;
- Signage indicating Hazardous Area;
- Wear appropriate Respiratory Protection Equipment (suggest a half mask respirator with P100 filter or P100 paper respirator), based on your company's Respiratory Code of Practice;
- Set up as per manufacturer's recommendations;
- Filtration systems, if included, should be maintained;
- The cabs of Mobile equipment moving within these areas should have a positive ventilation system and filtration unit with the cabs and windows of such vehicles should be shut during operation;
- Maintenance of filters/ventilation systems must follow manufacturer's specifications;
- Clean up a spilled dry or wet byproduct as mentioned in the general requirements;
- Assessing the need for a work clothing procedure to be in place before leaving sanding area, as mentioned in section 4.0;
- Take down the enclosed area.

## 13.0 MIXING MORTAR/SMALL AMOUNTS OF CONCRETE/CEMENT OR CONCRETE/CEMENT PRODUCTS

Attention should be taken when mixing small amounts of mortar or concrete products by hand. The following are recommended:

- Refer to SDS / MSDS of the product(s) being used;
- Create an enclosed or partially enclosed area;
- Signage indicating Hazardous Area;
- Wear appropriate Respiratory Protection Equipment (suggest a half mask respirator with P100 filter or P100 paper respirator), based on your company's Respiratory Code of Practice;
- Cut bag within enclosure and seal remainder of bag;
- Clean up a spilled dry or wet byproduct as mentioned in the general requirements;
- Respiratory protection not required when handling the wet mortar;
- Ensure a work clothing procedure is in place before leaving sanding area, as mentioned in section 4.0;
- Take down the enclosed area.

#### 14.0 CHIPPING, CUTTING, GRINDING, HAMMERING AND DRILLING OF CONCRETE OR MASONRY

Various concrete tasks, typically done in remediation work, expose the workers to varying degrees of exposure levels which change depending on the area of work, dust levels in and around the work area and whether indoors or outdoors (i.e. dirt roads combined with wind and/or activities around the work site). The following are recommended:

- Refer to SDS / MSDS of the product(s) being used;
- Use of wet coring and drilling tools whenever possible. The use of appropriate Respiratory Protection Equipment (suggest a half mask respirator with P100 filter or P100 paper respirator), based on your company's Respiratory Code of Practice, will still be required;
- Hoarding work areas to prevent Silica dust from becoming airborne to other work areas. Local exhaust ventilation (LEV) with filtration will also be required;
- When hoarding is not possible and area is remote to other workers, the use of dustless power tools which have attachments to a HEPA vacuum system can be used. The use of an appropriate Respiratory Protection Equipment (suggest a half mask respirator with P100 filter or P100 paper respirator), based on your company's Respiratory Code of Practice, will still be required;
- HEPA vacuums, replacement of filters and bags must follow manufacturer's specifications. Visual inspection of the HEPA vacuum are required prior to use and repeated prior to restarting the task after breaks or personnel changes. They require routine cleaning or disposal of prefilters;
- Use vacuums or wet sweeping to clean up concrete slurry.

In both options, you will require:

- Assessing the need for a work clothing procedure to be in place before leaving sanding area, as mentioned in section 4.0;

#### 15.0 TILE SETTING

Attention should be taken when mixing small amounts of mortar or concrete/cement products by hand. The following are recommended:

- Refer to SDS / MSDS of the product(s) being used;
- Create an enclosed or partially enclosed area;
- Signage indicating Hazardous Area;
- Wear appropriate Respiratory Protection Equipment (suggest a half mask respirator with P100 filter or P100 paper respirator), based on your company's Respiratory Code of Practice;
- Cut bag within enclosure and seal remainder of bag;
- Ensure housekeeping is maintained throughout the work shift;
- Take down the enclosed area;
- Always wet cut tile;
- Respiratory protection not required when handling the wet mortar;
- When using power tools to trim, have tools with attachments to a HEPA filtration System.



## 16.0 DRYWALL CUTTING

It is important to note that the dust left behind will cause potential silica exposure for other trades. The following are recommended:

- Enclose or partially enclose work areas;
- Wet sweep or Vacuum with HEPA systems often;
- HEPA vacuums, replacement of filters and bags must follow manufacturer's specifications. Visual inspection of the HEPA vacuum are required prior to use and repeated prior to restarting the task after breaks or personnel changes. They require routine cleaning or disposal of prefilters;
- Ensure housekeeping is maintained throughout the work shift;
- Assessing the need for a work clothing procedure to be in place before leaving sanding area, as mentioned in section 4.0;

## 17.0 DRYWALL SANDING

Sanding, even with the most competent tradesperson, is another potential silica risk generating activity. The following are recommended:

- Enclose work areas;
- Machine sand, when practicable, using attachments to a HEPA Filtration System (dustless tools);
- Hand sand using appropriate Respiratory Protection Equipment (suggest a half mask respirator with P100 filter or P100 paper respirator), based on your company's Respiratory Code of Practice;
- Ensure housekeeping is maintained throughout the work shift;
- Remove drywall dust, through wet sweeping or HEPA vacuuming, and pieces and seal in bags;
- HEPA vacuums, replacement of filters and bags must follow manufacturer's specifications. Visual inspection of the HEPA vacuum are required prior to use and repeated prior to restarting the task after breaks or personnel changes. They require routine cleaning or disposal of prefilters;
- Respiratory protection not required when handling the wet drywall mud;
- Ensure a work clothing procedure is in place before leaving sanding area, as mentioned in section 4.0.

## 18.0 STUCCO AND EIFS

Attention should be taken when mixing small amounts of mortar or concrete/cement products by hand. The following are recommended:

- Refer to SDS / MSDS of the product(s) being used;
- Mix product in an enclosed area;
- Wear appropriate Respiratory Protection Equipment, (suggest a half mask respirator with P100 filter or P100 paper respirator) based on your company's Respiratory Code of Practice;

- Cut bag within enclosure and seal remainder of bag;
- Mix product as per manufacturer's instructions and use product in wet state;
- Ensure housekeeping is maintained throughout the work shift;
- HEPA vacuums, replacement of filters and bags must follow manufacturer's specifications. Visual inspection of the HEPA vacuum are required prior to use and repeated prior to restarting the task after breaks or personnel changes. They require routine cleaning or disposal of prefilters;
- Respiratory protection not required when handling the wet product(s);
- Assessing the need for a work clothing procedure to be in place before leaving sanding area, as mentioned in section 4.0;
- Clean up a spilled dry or wet byproduct as mentioned in the general requirements.

## 19.0 FIRESTOPPER/INSULATION PRODUCTS

Both firestopping and various insulation products have varying amounts of silica. There are opportunities to use low/non-silica products in many cases, based on the application required. When hand mixed products such as many firestopping materials, there may be increased exposure to silica. The following are recommended:

### **Hand Mixing Firestopping products:**

- Refer to SDS / MSDS of the product(s) being used;
- Create an enclosed or partially enclosed area;
- Signage indicating Hazardous Area;
- Wear appropriate Respiratory Protection Equipment (suggest a half mask respirator with P100 filter or P100 paper respirator) , based on your company's Respiratory Code of Practice;
- Ensure housekeeping is maintained throughout the work shift;
- Remove dust/remaining product, through wet sweeping or HEPA vacuuming, and pieces and seal in bags;
- HEPA vacuums, replacement of filters and bags must follow manufacturer's specifications. Visual inspection of the HEPA vacuum are required prior to use and repeated prior to restarting the task after breaks or personnel changes. They require routine cleaning or disposal of prefilters;
- Ensure a work clothing procedure is in place before leaving sanding area, as mentioned in section 4.0;
- Take down the enclosed area.

**Insulation products:**

- Refer to SDS / MSDS of the product(s) being used;
- Wear product P.P.E. to handle product;
- Wear appropriate Respiratory Protection Equipment (suggest a half mask respirator with P100 filter) , based on your company's Respiratory Code of Practice;
- Ensure housekeeping is maintained throughout the work shift;
- Remove dust/remaining product, through manual handling, wet sweeping or HEPA vacuuming, and pieces and seal in bags;
- Assessing the need for a work clothing procedure to be in place before leaving sanding area, as mentioned in section 4.0;

**20.0 CONCLUSION**

The goal of the Alberta Construction Association has always been the health and safety of our member's workers. While the Alberta Construction Association is recommending these best practices, along with the Silica Protection Operating procedure and Silica Code of Practice documents, to assist our members meet the regulations and protect their workers from Silica exposure, each member company should assess the Silica hazards and may be required to exceed these recommendations.

As members of the ACA, we welcome any suggestions towards improving the health and safety of all our members through continuous improvements to these and all practices.