

Controlling Silica Exposures in Construction While Operating Hand-Operated Grinders

Silica is a mineral that is found in stone, soil and sand. It is also found in concrete, brick, mortar and other construction materials. Breathing in silica dust can cause silicosis, a serious lung disease. Using a hand-operated grinder on concrete, stone and similar materials can expose workers to hazardous levels of airborne silica. The small particles easily become suspended in the air and, when inhaled, penetrate deep into workers' lungs. Grinder operators' silica exposures are among the highest in the construction industry. This fact sheet describes ways to reduce workers' exposures to silica when using hand-operated grinders.

Silica Dust Control Methods

There are three main methods used to control silica dust when using hand-operated grinders:

- **Vacuum dust collection systems;**
- **Wet grinding;** and
- **Adjustments in work methods.**

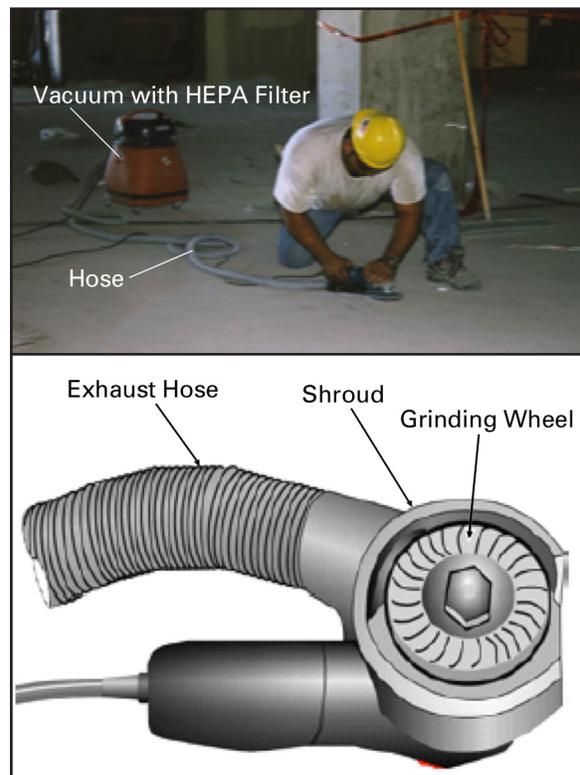
Vacuum Dust Collection Systems

Vacuum dust collection systems (VDCSs) are available for handheld grinders, often as an add-on unit. The VDCSs should include a shroud which surrounds the grinding wheel, a vacuum, hose and filter(s).

- Use a shroud or hood that is recommended by the tool manufacturer.
- Use a vacuum with enough suction to capture dust at the grinding point.
- Use a high-efficiency particulate air (HEPA) filter in the vacuum exhaust.
- Use a 1½- to 2-inch diameter vacuum exhaust hose or a hose size that is recommended by the tool manufacturer.
- Use a static pressure gauge, where available, to monitor performance.

VDCSs work best when workers are properly trained and use good work practices. For best results:

- **Keep** the vacuum hose clear and free of debris, kinks and tight bends.
- **Turn** the vacuum off and on regularly to reduce dust buildup on the filter, if it is not self-cleaning.
- **Change** vacuum-collection bags as needed.



Grinder with attached VDCS. (Photo courtesy of the University of Washington). Detail of grinder with VDCS attachment. (Courtesy of NIOSH).

- **Set up** a regular schedule for filter cleaning and maintenance.
- **Avoid** exposure to dust when changing vacuum bags and cleaning or replacing air filters.

Compressed Air

Do not use compressed air to clean surfaces, clothing, or filters because it can increase your exposure to silica. Clean only with a HEPA-filtered vacuum or by wet methods.

Wet Grinding

Water-fed control equipment is often used to reduce dust during granite and concrete grinding and polishing, and when concrete and masonry are cut with abrasive wheels. To be effective, a constant supply of water must be applied to the grinding or cutting point. Tools include a nozzle or spout that provides a stream of water to the grinding wheel. A helper also can apply water by hand using a spray nozzle.

Electrical Safety

Use ground-fault circuit interrupters (GFCIs) and watertight, sealable electrical connectors for electric tools and equipment on construction sites. These features are particularly important in wet or damp areas, such as where water is used to control dust.

Water-fed grinders can control dust even on uneven surfaces and near corners and edges, which are problem areas for vacuum dust collection equipment.

Adjustments in Work Methods

Adjusting work practices may also reduce silica exposures:

- **Use** a smaller wheel and use the least aggressive tool that will do the same job whenever possible. Larger wheels and more aggressive wheels (e.g., diamond wheels) result in higher silica exposures.

- **Reduce** the amount of fine grinding required. For example, less dust is created when material is removed by chipping instead of grinding. Use a hammer and chisel or power chipping tool to remove most of the material before using a grinder to smooth the surface.

Respiratory Protection

When wet grinding is not feasible and VDCSs do not reduce silica exposures to OSHA's permissible exposure limit, workers will need respiratory protection. Where respirators are required, employers have to put in place a written respiratory protection program in accord with [OSHA's Respiratory Protection standard](#). It must include the following:

- How to select a respirator;
- Fit testing;
- Directions on proper use, maintenance, cleaning and disinfecting;
- Medical evaluations of workers; and
- Training.

For more information on how to determine proper respiratory protection, visit OSHA's web site at www.osha.gov.

For more detailed information on controlling silica exposures when using hand-operated grinders, refer to OSHA Publication 3362, [Controlling Silica Exposures in Construction](#).

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.



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