

Controlling Silica Exposures in Construction While Operating Jackhammers

Silica is a mineral that is found in stone, soil and sand. It is a common component of concrete, brick, mortar and other construction materials. Breathing in silica dust can cause silicosis, a serious lung disease. Using a jackhammer to chip or break up concrete, stone, brick 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. This fact sheet describes ways to reduce workers' exposures to silica when using jackhammers.

Silica Dust Control Methods

The best way to control silica dust when using a jackhammer is with wet methods, where water is sprayed constantly to reduce the amount of dust that gets into the air. Wetting the surface with a spray or mist of water at the point where the jackhammer's tip strikes the surface material helps reduce the amount of airborne dust.

Manual Spraying by Helper

One simple approach to keeping dust under control:

- Use a dedicated helper to direct a constant spray of mist at the impact point while another worker operates the jackhammer.
- Use a spray nozzle similar to those that fit on a garden hose for this job.

Just picking up a hose and spraying the general area every so often is not effective. Simply pre-wetting the concrete or asphalt before the jackhammer breaks the surface is also not effective, because the jackhammer continues to break through dry material that contains silica and is constantly producing dust. To be effective, mist must be applied constantly at the point where the jackhammer hits the surface.

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.



A worker chips concrete with a jackhammer using a water-spray attachment to control dust. (Photo courtesy of NIOSH).

Water-Spray Systems

Jackhammers retrofitted with a spray nozzle aimed at the tip of the tool can lower silica exposures. Although water-spray controls for jackhammers are not commercially available, it is possible to retrofit most existing equipment. Necessary parts are available at well-stocked hardware stores.

Two organizations have developed designs for a water-spray retrofit system for jackhammers. The National Institute for Occupational Safety and Health (NIOSH) designed, tested and implemented an easy-to-build water-spray attachment for jackhammers. It can be made fairly easily using the parts and instructions described at

www.cdc.gov/niosh/docs/wp-solutions/2008-127/pdfs/2008-127.pdf. The New Jersey Laborers Health and Safety Fund modified the NIOSH spray design and also developed a simple, durable, low-cost water-spray attachment for use on a jackhammer. A detailed description may be found at www.njlaborers.org/health/pdfs/other/jackhammer.pdf.

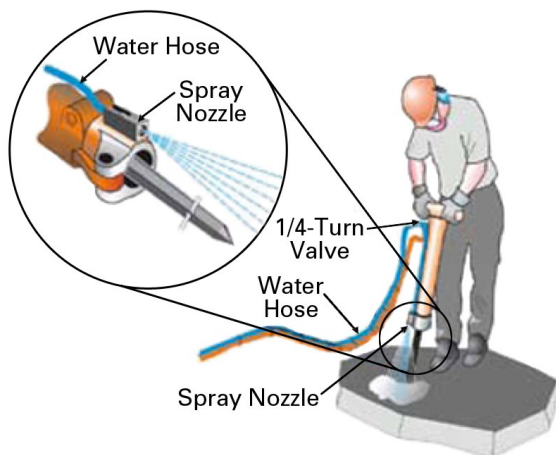


Diagram of water-spray control for jackhammers developed by NIOSH.

Employers need to train workers on the proper use of wet methods to reduce visible dust:

Dust and debris can clog spray nozzles. Check the nozzle frequently. If the job starts looking dusty, observe the spray for a few seconds to be sure there is adequate water spray and that it is directed at the tool tip. The nozzle should be cleaned or changed if it is dripping, spitting, or squirting. Keep spare nozzles on hand for quick changes.

Take steps to provide a consistent water flow. Make sure there is an adequate supply of water. Prevent kinked hoses, large drops in water pressure and heavy equipment or car traffic running over hoses.

The spray angle is critical. Check the water-spray angle frequently. Make sure:

- The spray is focused on the breakpoint;
- The spray is wetting the dust before it can spread away from the tip of the hammer.

Compressed Air

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

Respiratory Protection

In some cases, such as when water-spray attachments are not available, when work is done in enclosed spaces, or when more than one jackhammer is used in the same work area, silica exposures may exceed OSHA's permissible exposure limit and 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 jackhammers, 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.



U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)