

CONTROL OF SILICA DUST IN CONSTRUCTION

Large Drivable Milling Machines (Half Lane and Larger)

Using large drivable milling machines (half lane or more) on asphalt pavement, concrete, and other silica-containing materials can generate *respirable crystalline silica* dust. When inhaled, the small particles of silica can irreversibly damage the lungs. This fact sheet describes dust controls that can be used to minimize the amount of airborne dust when using large drivable milling machines as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, **29 CFR 1926.1153**.

Engineering Control Method: Exhaust ventilation on drum enclosure with water spray *OR* Water spray with surfactant (for cuts less than four inches)

Wet methods reduce the amount of silica dust that becomes airborne when using milling machines, because they control exposure at the source. OSHA has determined that it is necessary to supplement water sprays with a dust suppressant additive or with exhaust ventilation. Water amended with a foam additive or surfactant performs better for dust suppression (surfactants are essentially equivalent to dish soap). The soap breaks the surface tension and softens the water, which improves silica dust capture.

Large drivable milling machines can be equipped with a combination of water sprays, exhaust ventilation and surfactants to effectively control silica dust. The exact combination varies with milling depth and substrate material. For cuts of:

- **Four inches or less in depth on any substrate,** Table 1 includes two options. Employers may use a machine equipped with exhaust ventilation on the drum enclosure and supplemental water sprays designed to suppress dust; OR they may use a machine equipped with supplemental water spray designed to suppress dust. In the second option the water must be combined with a surfactant.
- **More than four inches on asphalt only,** Table 1 requires the use of exhaust ventilation on the drum enclosure and supplemental water sprays designed to suppress dust.

- **More than four inches in depth on substrates other than asphalt** are not included on Table 1. The control techniques described above can be used to reduce dust exposures, however, the employer must conduct an exposure assessment and may need to take additional actions.



Cutting drum with enclosure on large milling machine.

Photo courtesy of NIOSH



Milling machine milling asphalt road and loading debris into haul truck.

Photo courtesy U.S. Air Force, Beth Holliker

Wet Methods

Large milling machines currently come equipped with water spray systems for dust suppression. The machine must be operated and maintained to minimize dust emissions. Make sure to:

- **Rinse or replace** water filters according to the manufacturers' instructions to ensure they are clean and not clogged.
- **Adjust** the location and orientation of spray nozzles to direct water to the front of the cutter drum, primary (collection) conveyor, secondary (loading) conveyor, discharge pipe, and transfer points.
- **Check** that nozzles are not clogged and spray patterns effectively suppress dust.
- **Conduct** routine inspections to be sure that the system components are working properly.

Exhaust Ventilation

The drum housing and conveyors on the milling machine enclose the cutter drum and conveyor belts. A well-enclosed drum housing and conveyor system can reduce workers' dust exposure. Typical ventilation controls designed to reduce dust emissions from a piece of equipment consist of a hood, fan, ductwork, and dust collector.

Employers are responsible for keeping equipment in good working condition to minimize dust. Employers must also ensure that workers are properly trained on operating the equipment and reducing exposures through good work practices. Focus on the following:

- **Ensure** that the ventilation control has enough velocity to prevent dust from settling and plugging the flow.
- **Check** flashing placement at transfer points and making sure it is in good working condition.
- **Check to ensure** that there are no gaps or leaks around conveyor enclosures and ductwork.
- **Replace** worn cutting teeth.
- **Conduct** routine inspections to be sure that the system components are working properly.

Respiratory Protection

When properly used, wet methods and exhaust ventilation can effectively control exposure to silica dust. Therefore, Table 1 in the silica standard for construction does not require use of respiratory protection when operating large drivable milling machines equipped with the dust controls described in this fact sheet.

Additional Information

For more information, visit www.osha.gov/silica and see the OSHA Fact Sheet on the [Crystalline Silica Rule for Construction](#), and the [Small Entity Compliance Guide for the Respirable Crystalline Silica Standard for Construction](#).

OSHA can provide compliance assistance through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education. OSHA's On-Site Consultation Program offers free, confidential occupational safety and health services to small and medium-sized businesses in all states and several territories across the country, with priority given to high-hazard worksites. On-Site consultation services are separate from enforcement and do not result in penalties or citations. To locate the OSHA On-Site Consultation Program nearest you, visit www.osha.gov/consultation.

How to Contact OSHA

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

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.



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