HBACA Builder Safety Committee

Silica Safety Awareness Initiative

October 2021

Initiative & Stand Down Kit

The HBACA is excited to announce that October is Silica Safety Awareness Month. All Builders are asked to join us in our Silica Awareness Stand Down the week of October 18, 2021. In addition, feel free to break out the Tool Box Talks throughout the month.

Distribution Network

HBACA members field employees and at the discretion of each builder and their trade partners. Builders are encouraged to distribute these accordingly and organize brief safety meetings/discussion sessions throughout their communities.

Elements of the Kit:

Tool Box Talk #1 - **Crystalline Silica Dust (English & Spanish)**

Learn more about Crystalline Silica Dust and safe work practices when there is possible exposure.

Tool Box Talk #2 – **Silica Rule and Written Exposure Plan**

Overview of Silica Rule and Developing a Written Exposure Plan.

Tool Box Talk #3 - **Engineering Controls for Various Tasks**

(1) Handheld Power Saws (2) Walk-Behind Saws (3) Handheld Grinders for Mortar Removal (Tuckpointing) (4) Handheld and Stand-Mounted Drills (5) Handheld Power Saws Used to Cut Fiber-Cement Board (6) Stationary Masonry Saws (7) Jackhammers or Handheld Powered Chipping Tools (8) Handheld Grinders for Tasks Other Than Mortar Removal

HBACA

Home Builders Association of Central Arizona

Learn more at www.hbaca.org

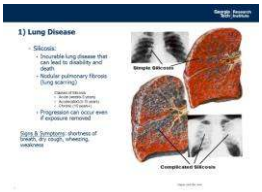
Tool Box Talk #1 -

Crystalline Silica Dust Awareness Silica Toolbox Talk #1 -
Crystalline Silica Dust Awareness (English & Spanish)(English & Spanish)

TOOLBOX TALK

CRYSTALLINE SILICA DUST AWARENESS

Crystalline silica is a common mineral in the earth's crust, and is found in many types of rock including sand, quartz, and granite. Silica is present in both work and non-work environments, and exposure to crystalline silica dust has long been known to cause a disease called silicosis. When you inhale crystalline silica the lung tissue reacts by developing fibrous tissue around trapped silica particles. This condition of the lung is called silicosis.



Due to the extensive use of concrete and masonry products in buildings today, construction workers have a potential exposure to crystalline silica.

Exposure has been found when employees perform one of these tasks:

- Grinding
- Crushing
- Hauling
- Chipping
- Hammering
- Drilling
- Sawing
- Blasting
- Dry sweeping
- Compressed air
- Mixing mortar or concrete

In addition, always follow safe work practices when there is possible exposure to silica dust.

Recognize when silica dust may be generated and plan ahead to eliminate or control the dust at the source.

- Use proper respiratory protection when point of operation controls cannot keep exposures below the recommended exposure limit. Your supervisor and safety team would make you aware when respiratory protection is necessary

- Always use dust control systems when they are available and keep them well maintained such as

Be aware that high silica concentrations can occur inside and outside enclosed areas during operations such as concrete or masonry sawing or abrasive blasting.

- Do not eat, drink, or smoke in areas where sandblasting is being done, or where silica dust is being generated.
- Wash your hands and face before eating, drinking, or smoking and vacuum (don't blow) dust from your clothing.
- Clean yourself before leaving the job site to prevent contamination of cars, homes, and other work areas.

Consult Table 1 to for Specified Silica Control Methods

https://www.osha.gov/silica/Table1sect1926.1153.pdf

DATE: _____

PARTICIPANTS:

1. _____
2. _____
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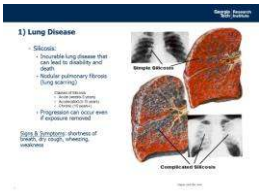
SPANISH
TOOLBOX TALK
CRYSTALLINE SILICA DUST AWARENESS

Silica Cristalina es un mineral común en la tierra. Se encuentra en muchas clases de rocas incluyendo arena, cuarzo y granito. Se consigue silica en ambientes de trabajos y aun en aquellos que nos son ambientes de trabajo y por largo tiempo se ha sabido que la exposición al polvo de silica cristalina causa silicosis. Cuando usted inhala silica cristalina los tejidos de los pulmones reaccionan y desarrollan tejidos fibrosos que rodean y atrapan las partículas de silica; esta condición en los pulmones es llamada silicosis.



Hoy en día por causa del uso extenso del concreto y los productos de concreto los trabajadores en la construcción potencialmente están expuestos a silica cristalina.

Los trabajadores se exponen cuando hacen los siguientes trabajos.

- moliendo concreto/piedras
- triturando
- transportando
- rompiendo concreto/piedras
- martillando
- perforando/taladrando
- cortando
- detonando
- barriendo en seco
- usando aire comprimido
- mezclando concreto

Siempre siga prácticas seguras de trabajo cuando exista la posibilidad de estar expuesto al polvo de silica cristalina.

Reconozca cuando el polvo de silica puede ser generado y planifique con anticipación como eliminar y controlar el polvo en el momento que es generado.

- Use protección respiratoria apropiada cuando los sistemas para controlar el polvo de silica no pueden mantener la concentración de polvo por debajo del límite de exposición recomendado. Su supervisor le hará saber cuándo es necesario protección respiratoria.

- Siempre use sistemas para controlar el polvo de silica cuando estén disponibles y manténgalos en buenas condiciones; tal como agua.

Recuerde que altas concentraciones de silica pueden ocurrir dentro y fuera de las áreas de operación tales como cortar concreto o taladrando concreto.

- No coma, beba o fume en áreas donde se conducen actividades como sandblasting o en áreas donde polvo de silica se está generando.
- Lávese las manos y la cara antes de comer, beber o fumar y use una aspiradora para limpiar el polvo de su ropa, NO LO SOPLE CON AIRE COMPRIMIDO.
- Liempise a si mismo antes de salir del trabajo para prevenir contaminar sus autos, casas, y otras áreas de trabajo.

Consult Table 1 for Specified Silica Control Methods

https://www.osha.gov/silica/Table1sect1926.1153.pdf

FECHA: _____

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Silica Tool Box Talk #2 -

Overview of Silica Rule and Developing a Written Exposure Plan (English Only)

OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

OSHA's Respirable Crystalline Silica Standard for Construction

Workers who are exposed to respirable crystalline silica dust are at increased risk of developing serious silica-related diseases. OSHA's standard requires employers to take steps to protect workers from exposure to respirable crystalline silica.

What is Respirable Crystalline Silica?

Crystalline silica is a common mineral that is found in construction materials such as sand, stone, concrete, brick, and mortar. When workers cut, grind, drill, or crush materials that contain crystalline silica, very small dust particles are created. These tiny particles (known as "respirable" particles) can travel deep into workers' lungs and cause silicosis, an incurable and sometimes deadly lung disease. Respirable crystalline silica also causes lung cancer, other potentially debilitating respiratory diseases such as chronic obstructive pulmonary disease, and kidney disease. In most cases, these diseases occur after years of exposure to respirable crystalline silica.

How are Construction Workers Exposed to Respirable Crystalline Silica?

Exposure to respirable crystalline silica can occur during common construction tasks, such as using masonry saws, grinders, drills, jackhammers and handheld powered chipping tools; operating vehicle-mounted drilling rigs; milling; operating crushing machines; using heavy equipment for demolition or certain other tasks; and during abrasive blasting and tunneling operations. About two million construction workers are exposed to respirable crystalline silica in over 600,000 workplaces.

What Does the Standard Require?

The standard (29 CFR 1926.1153) requires employers to limit worker exposures to respirable crystalline silica and to take other steps to protect workers. Employers can either use a control method laid out in **Table 1** of the construction standard, or they can measure workers' exposure to silica and independently decide which dust controls work best to limit exposures in their workplaces to the permissible exposure limit (PEL).

What is Table 1?

Table 1 matches 18 common construction tasks with effective dust control methods, such as using water to keep dust from getting into the air or using a vacuum dust collection system to capture dust. In some operations, respirators may also be needed. Employers who follow Table 1 correctly are not required to measure workers' exposure to silica from those tasks and are not subject to the PEL.

Table 1 Example: Handheld Power Saws

If workers are sawing silica-containing materials, they can use a saw with a built-in system that applies water to the saw blade. The water limits the amount of respirable crystalline silica that gets into the air.

Table 1: Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

Equipment/ Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hrs/ shift	> 4 hrs/ shift
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • When used outdoors. • When used indoors or in an enclosed area.	None APF 10	APF 10 APF 10

Excerpt from Table 1 in 29 CFR 1926.1153

In this example, if a worker uses the saw outdoors for four hours or less per day, no respirator would be needed. If a worker uses the saw for more than four

hours per day or any time indoors, he or she would need to use a respirator with an assigned protection factor (APF) of at least 10, such as a NIOSH-certified filtering facepiece respirator that covers the nose and mouth (sometimes referred to as a dust mask). See the respiratory protection standard (29 CFR 1910.134) for information on APFs.

Alternative Exposure Control Methods

Employers who do not fully implement the control methods on Table 1 must:

- **Determine the amount of silica that workers are exposed to** if it is, or may reasonably be expected to be, at or above the **action level of 25 µg/m³** (micrograms of silica per cubic meter of air), averaged over an 8-hour day;
- Protect workers from respirable crystalline silica exposures above the **PEL of 50 µg/m³**, averaged over an 8-hour day;
- Use **dust controls** and safer work methods to protect workers from silica exposures above the PEL; and
- Provide **respirators** to workers when dust controls and safer work methods cannot limit exposures to the PEL.

What Else Does the Standard Require?

Regardless of which exposure control method is used, all construction employers covered by the standard are required to:

- Establish and implement a **written exposure control plan** that identifies tasks that involve exposure and methods used to protect workers, including procedures to restrict access to work areas where high exposures may occur;
- Designate a **competent person** to implement the written exposure control plan;
- Restrict **housekeeping** practices that expose workers to silica, such as use of compressed air without a ventilation system to capture the dust and dry sweeping, where effective, safe alternatives are available;
- Offer **medical exams**—including chest X-rays and lung function tests—every three years for workers who are required by the standard to wear a respirator for 30 or more days per year;
- **Train workers** on the health effects of silica exposure, workplace tasks that can expose them to silica, and ways to limit exposure; and
- **Keep records** of workers' silica exposure and medical exams.

Applying water to the blade of a handheld power saw reduces the amount of dust created when cutting.

Additional Information

Additional information on OSHA's silica standard can be found at www.osha.gov/silica.

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. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing and improving safety and health management systems. To locate the OSHA On-Site Consultation Program nearest you, call 1-800-321-OSHA or 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.

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U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

DSG FS-3681 12/2017

WRITTEN EXPOSURE CONTROL PLAN

Company: _____ Date: _____

Name of Competent Person: _____ Contact Info: _____

Jobsite/Project: _____

Brief description of the work / task: _____

_____

_____

Materials (check all that apply):

[ ] Brick / Block
[ ] Concrete
[ ] Mortar / grout
[ ] Rock
[ ] Stone
[ ] Granite
[ ] Tile
[ ] Fiber-cement Board
[ ] Soil
[ ] Other: _____

Tasks (check all that apply):

[ ] Cutting/sawing
[ ] Drilling
[ ] Jackhammering/chipping
[ ] Grinding
[ ] Milling
[ ] Earthmoving
[ ] Demolishing/disturbing
[ ] Sanding
[ ] Sacking/patching
[ ] Roofing
[ ] Polishing
[ ] Abrasive sandblasting
[ ] Mixing/pouring
[ ] Sweeping/cleaning up
[ ] Other: _____

Describe the specific tasks that will be performed that involve exposure to respirable crystalline silica:

_____

_____

_____

Equipment (check all that apply):

[ ] Hand-held saw with vacuum
[ ] Hand-held saw with water
[ ] Stationary masonry saw with vacuum
[ ] Stationary masonry saw with water
[ ] Walk-behind saw with water
[ ] Handheld/stand mounted drill with vacuum
[ ] Hand-held angle grinder with vacuum
[ ] Tuckpointing grinder with vacuum
[ ] Walk behind milling machine with water
[ ] Portable mixing station with vacuum
[ ] Dust collector/vacuum for sweeping
[ ] Grading or excavating in enclosed cab

[ ] Jackhammer/chipping tool with vacuum [ ] Grading or excavating with water

[ ] Jackhammer/chipping tool with water [ ] Other: _____

Describe the specific equipment (including all components) that will be used on the job: _____

_____

_____

_____

Work Practice Controls (check all that apply):

Wet cutting:

[ ] Operate and maintain tools in accordance with manufacturer's instructions

[ ] Check flow rates to minimize release of visible dust

[ ] Ensure spray nozzle is working properly

[ ] Apply water at the point of dust generation

[ ] Check spray nozzle and hoses to ensure they are not clogged or damaged

[ ] Check all hoses and connections to ensure they are intact

[ ] Rinse or replace water filters as needed

[ ] Replace water when it gets gritty or begins to silt up with dust

[ ] Other: _____

Vacuum Dust Collection System:

[ ] Operate and maintain tools in accordance with manufacturer's instructions

[ ] Check shrouds and hoses to ensure they are not clogged or damaged

[ ] Check all hoses and connections to ensure they are intact

[ ] Ensure that the vacuum has enough suction to capture dust at the cutting point

[ ] Change or clean filter(s) in accordance with the manufacturer's instructions

[ ] Empty dust collection bags often to avoid overfilling

[ ] Keep blade flush against the surface whenever possible

[ ] Other: _____

Tasks performed indoors or in enclosed areas:

[ ] Provide exhaust to minimize the accumulation of visible airborne dust.

[ ] Portable fans (box fans, floor fans, and axial fans)

[ ] Portable ventilation systems

[ ] Other systems that increase air movement

Describe the work practice controls that will be used on the job: _____

_____

_____

_____

Respirator Protection (check all that apply):

[ ] "N-95" dust mask respirator

[ ] Half-facepiece elastomeric respirator

[ ] Full-face elastomeric respirator

[ ] Powered air-purifying respirator

[ ] Other: _____

**Ensure that all employees who wear a respirator are medically fit to wear a respirator, have been fit-tested and trained on the proper way to wear the respirator and are clean-shaven.

Describe the specific respirators that will be used to limit employee exposure: _____

_____

_____

Housekeeping Controls (check all that apply):

[ ] Wet sweeping of work surfaces

[ ] Use Sweeping compound

[ ] HEPA-filtered vacuuming of work surfaces

[ ] Dispose of used vacuum bags in a container

[ ] No dry sweeping

[ ] No compressed air

[ ] Other: _____

Describe the specific housekeeping measures that will be used to limit employee exposure: _____

_____

_____

Restrict Access (check all that apply):

[ ] Schedule certain tasks when others are not around

[ ] Post warning signs, cones or barrier tape

[ ] Tell employees to stay out of areas where dust is generated if they do not need to be in the area

[ ] Move employees to areas where they are not exposed to dust if possible

[ ] Other: _____

Describe the specific procedures to restrict access to work areas to minimize the number of employees exposed to silica dust: _____

_____

_____

Silica Tool Box Talk #3 -

Engineering Controls for Various Tasks (English Only)

OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

CONTROL OF SILICA DUST IN CONSTRUCTION
Handheld Power Saws

Using a handheld power saw (also called a cut-off saw) to cut masonry, concrete, stone, or 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 dust that gets into the air when using handheld power saws with an integrated water delivery system as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153. This fact sheet does not apply to handheld saws used to cut fiber-cement board.

Engineering Control Method: Water applied continuously to the saw blade

Wet Cutting

Many handheld power saws come equipped with an integrated water delivery system designed to cool the blade by directing a continuous stream of water onto the blade where it wets the material being cut and reduces the amount of dust generated when cutting. Water can be supplied to the saw by either a pressurized container or by a constant water supply such as a hose connected to a faucet or construction site water supply. Water flow rates must be sufficient to minimize release of visible dust.

Photo courtesy of OSHA

A construction worker using a handheld power saw with an integrated water delivery system.

The saw must be operated and maintained in accordance with manufacturer's instructions to minimize dust emissions. Focus on the following areas:

- **Check** that hoses are securely connected and are not cracked or broken.
- **Adjust** nozzles so that water goes to the blade and wets the cutting area.
- **Inspect** the saw blade before use to be sure it is in good condition and does not show excessive wear.
- **Maintain** and operating the saw's dust-control equipment based on the manufacturer's instructions.

Clean up any slurry produced to prevent the slurry from drying and releasing silica dust into the air. Wet slurry can be cleaned up using, for example, shovels or a wet vacuum equipped with a HEPA filter.

Wet Cutting Indoors or in Enclosed Areas

Wet cutting indoors or in enclosed areas may not reliably keep silica exposures low, so extra ventilation or a means of exhaust may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- Exhaust trunks
- Portable exhaust fans
- Air ducts
- Other means of mechanical ventilation

Ensure air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows. Position the ventilation to move contaminated air away from the workers' breathing zones.

Electrical Safety. Where water is used to control dust, electrical safety is a particular concern. Use ground-fault circuit interrupters (GFCIs) and watertight, sealable electrical connectors for electric tools and equipment on construction sites.

Respiratory Protection

In addition to using wet cutting methods, respiratory protection with a minimum Assigned Protection Factor **(APF) of 10** is required on Table 1 when wet cutting with handheld masonry saws **indoors or in an enclosed** area, or used outdoors for **more than four hours** per shift.

When respirators are required, employers must put in place a written respiratory protection program in accordance with OSHA's Respiratory Protection standard 29 CFR 1910.134.

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.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information, see OSHA's Workers page.

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.

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DSG FS-3627 12/2017

OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

CONTROL OF SILICA DUST IN CONSTRUCTION
Walk-Behind Saws

Using a walk-behind saw to cut masonry, concrete, stone, or 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 dust that gets into the air when using walk-behind saws as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153.

Engineering Control Method: Water continuously fed to saw blade

Wet Cutting

Wet cutting is an effective method to reduce exposure to silica dust when using walk-behind saws equipped with an integrated water delivery system that directs a continuous stream of water onto the blade where it wets the material being cut and reduces the amount of dust generated. These saws have built-in water tanks, or water is supplied to the saw from a source such as a hose connected to a faucet or portable tank. Water flow rates must be sufficient to minimize the release of visible dust.

Photo courtesy of OSHA

Worker using a walk-behind saw with an integrated water delivery system to cut asphalt roadway.

The saw must be operated and maintained in accordance with manufacturer's instructions to minimize dust emissions. Focus on the following:

- **Check** that hoses are securely connected and are not cracked or broken.
- **Adjust** nozzles so that water goes to the blade and wets the cutting area.
- **Inspect** the saw blade before use to be sure it is in good condition and does not show excessive wear.

Clean up any slurry produced during wet cutting to prevent the slurry from drying and releasing silica dust into the air. Wet slurry can be cleaned up using, for example, shovels or a vacuum equipped with a HEPA filter.

Indoors or in Enclosed Spaces

Using wet methods indoors or in an enclosed area may not reliably keep exposure low, so extra ventilation may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- Exhaust trunks
- Portable exhaust fans
- Air ducts
- Other means of mechanical ventilation

Ensure air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows. Position the ventilation to move contaminated air away from the workers' breathing zones.

Electrical Safety. Where water is used to control dust, electrical safety is a particular concern. Use ground-fault circuit interrupters (GFCIs) and watertight, sealable electrical connectors for electric tools and equipment on construction sites.

Respiratory Protection

When properly used outdoors, wet methods can effectively control silica dust. Therefore, Table 1 in the silica standard does not require use of respiratory protection when cutting with walk-behind saws using wet methods **outdoors**.

However, when wet cutting with walk-behind saws **indoors or in enclosed** areas, Table 1 requires the use of respiratory protection with a minimum Assigned Protection Factor **(APF) of 10.** When respirators are required, employers must put in place a written respiratory protection program in accordance with OSHA's Respiratory Protection standard 29 CFR 1910.134.

Additional Information

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- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

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U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

DSG FS-3633 12/2017

OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

CONTROL OF SILICA DUST IN CONSTRUCTION

Handheld Grinders for Mortar Removal (Tuckpointing)

The use of a handheld grinder to remove mortar when tuckpointing can generate *respirable crystalline silica* dust. When inhaled, the small particles of silica can irreversibly damage the lungs. This fact sheet describes control measures to minimize the amount of airborne dust when using handheld grinders to remove mortar between brick, stone, and concrete blocks as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153.

Engineering Control Method: Vacuum Dust Collection System

Vacuum Dust Collection System (VDCS)

A VDCS can be used to capture the dust generated when removing mortar with a handheld grinder. Employers can comply with Table 1 in the silica standard by using a:

- Commercially available shroud on the grinding wheel designed to fit the grinder and wheel size.
- Vacuum that provides at least 25 cubic feet per minute (cfm) of airflow per inch of blade to capture dust at the point of grinding and removing mortar. For example, a 5" grinding wheel would require a rating of 125 cfm of air flow or more for effective capture.
- Vacuum equipped with a cyclonic pre-separator or filter- cleaning mechanism with a filter that has 99 percent or greater collection efficiency for respirable-sized particles.
- Vacuum exhaust hose capable of providing the airflow recommended by the tool manufacturer. A 1.5" to 2" diameter vacuum exhaust hose is typically adequate.

The grinder and dust collector must be operated and maintained in accordance with the manufacturer's instructions to minimize dust emissions. VDCSs are most effective when workers are properly trained and use good work practices, including:

- **Make sure to keep** the vacuum hose clear and free of debris, kinks, and tight bends.
- **Follow** the equipment manufacturer's directions on how to reduce dust buildup on the filter.
- **Change** vacuum-collection bags as needed. Do not overfill the bag.
- **Set** a regular schedule for maintenance and filter cleaning of the grinder and VDCS.
- **Avoid** exposure to dust when changing vacuum bags and cleaning or replacing air filters.

Photo courtesy of OSHA

Worker grinding mortar from between bricks (tuckpointing) with a handheld grinder equipped with a shroud and dust collection system using respiratory protection.

Proper handling of the handheld grinder is very important. Ensure the following occurs:

- **Place** one side of the shroud against the working surface before inserting the blade into the mortar joint. This directs the dust into the shroud as the blade cuts into the mortar joint.
- **Keep** the shroud tight against the working surface. This cuts down on dust that would otherwise escape from the collection system.
- **Move** the grinder counter to the direction of blade rotation to minimize escaping dust.
- **Back off** the cutting pressure of the blade a short distance before removing it from the slot so the vacuum can have enough time to clear any dust buildup.
- **Do not** move the grinder back and forth along the slot, as this will create a gap that increases dust escape. For better results, move the grinder in one direction, making a second pass only if necessary.
- **Use** only enough cutting force to operate the tool effectively and keep the leading tool edge flush against the working surface. Do not leave a large gap between the shroud and uncut mortar.

Use of Compressed Air. Unless there is a ventilation system that effectively captures the dust cloud, do not use compressed air or blowers to clean surfaces, clothing, or filters because it can increase exposure to silica. Instead, clean with a HEPA filter-equipped vacuum or by wet methods.

Indoors or in Enclosed Areas

Using a VDCS indoors or in an enclosed area may not reliably keep exposure low, so extra ventilation may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- Exhaust trunks
- Portable exhaust fans
- Air ducts
- Other means of mechanical ventilation

Photo courtesy of OSHA

Worker is showing a handheld grinder equipped with shroud.

Ensure air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows. Position the ventilation to move contaminated air away from the workers' breathing zones.

Respiratory Protection

In addition to using a VDCS, respiratory protection with a minimum Assigned Protection Factor **(APF) of 10** is also required whenever a handheld grinder for mortar removal is **used for 4 hours or less** per shift. Respiratory protection with a minimum **APF of 25** is required whenever a handheld grinder for mortar removal is used for **more than 4 hours** per shift.

When respirators are required, employers must put in place a written respiratory protection program in accordance with OSHA's Respiratory Protection standard 29 CFR 1910.134.

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.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information, see OSHA's Workers page.

How to Contact OSHA

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OSHA® Occupational Safety and Health Administration

DSG FS-3632 12/2017

OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

CONTROL OF SILICA DUST IN CONSTRUCTION
Handheld and Stand-Mounted Drills

The use of handheld and stand-mounted drills, impact and rotary hammer drills, and similar tools used to drill holes in concrete, masonry, or other silica-containing materials can generate *respirable crystalline silica* dust. When inhaled over time, 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 handheld and stand-mounted drills as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153.

Engineering Control Method: Vacuum Dust Collection System

Vacuum Dust Collection System (VDCS)

When using handheld or stand mounted drills to drill into concrete or other materials that contain crystalline silica, reduce exposure to silica dust by enclosing the drill in a commercially available shroud or cowling with a vacuum attached to capture the silica dust as it is generated around the drill bit.

A VDCS is commercially available in a variety of designs that include a dust collection device (shroud or cowling), vacuum, hose, filter, and filter-cleaning mechanism. These systems are typically available integrated into the tools or as add-on systems.

The VDCS must be equipped with a:

- Shroud or cowling sized to fit around the drill bit that is compatible with the manufacturer's vacuum system;
- Vacuum that is rated to provide the airflow recommended by the tool manufacturer or greater to remove dust at the drilling point; and
- Air filter with a 99 percent or greater efficiency and a filter cleaning mechanism.

The drill and VDCS must be operated and maintained in accordance with the manufacturer's instructions to minimize dust emissions. Focus on the following areas:

- **Keep** the vacuum hose clear and free of debris, kinks and tight bends.
- **Activate** any non-automatic filter-cleaning mechanism as needed to reduce dust buildup on the filter.
- **Change** vacuum-collection bags as needed.
- **Set** a schedule for filter cleaning and maintenance.
- **Avoid** exposure to dust when changing vacuum bags and cleaning or replacing air filters.

When necessary to clean the dust and debris from the drilled holes, a HEPA-filtered vacuum system must be used to capture the dust.

Photo courtesy of OSHA

Worker drilling into concrete with a rotary hammer equipped with a shroud and dust collection system.

Indoors or in Enclosed Areas

Using a VDCS indoors or in enclosed areas may not reliably keep silica exposures low, so extra ventilation may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- Exhaust trunks
- Portable exhaust fans
- Air ducts
- Other means of mechanical ventilation

Ensure air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows. Position the ventilation to move contaminated air away from the workers' breathing zones.

Compressed Air. Unless there is a ventilation system that effectively captures the dust cloud, do not use compressed air or blowers to clean surfaces, clothing or filters because it can increase exposure to silica. Instead, clean with a HEPA-filter equipped vacuum or by wet methods.

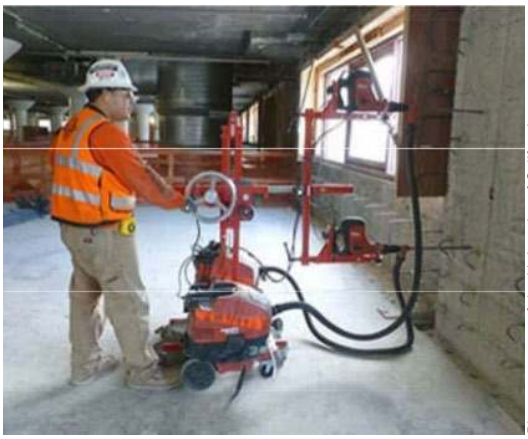

Photo courtesy of the University of California, Berkeley (D. Rempel)

Worker drilling horizontal holes in a concrete wall using two stand-mounted drills equipped with two dust collectors. Note that the shrouds around drill bits, black hose, and dust collector are attached conveniently to the stand.

Respiratory Protection

When properly used, a VDCS can reduce airborne dust levels to below the permissible exposure limit (PEL) of 50 µg/m^3, calculated as an 8-hour time-weighted average. Therefore, respiratory protection is not required when using drills equipped with a VDCS and a filter cleaning mechanism as specified earlier.

Additional Information

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OSHA® Occupational Safety and Health Administration

DSG FS-3630 12/2017

OSHA® FactSheet

CONTROL SILICA DUST
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CONTROL OF SILICA DUST IN CONSTRUCTION

Handheld Power Saws Used to Cut Fiber-Cement Board

Using a handheld circular saw to cut fiber-cement board can generate *respirable crystalline silica* dust. When inhaled over time, the small particles of silica can irreversibly damage the lungs. This fact sheet describes dust controls to minimize the amount of airborne dust when using handheld circular saws with a blade diameter of 8 inches or less to cut fiber-cement board as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153.

Engineering Control Method: Vacuum Dust Collection System

Fiber-cement board is a composite material made from cement, sand, and cellulose fibers. Cutting fiber-cement boards with high speed circular saws generates airborne dust that contains respirable crystalline silica. Specialty saw blades having 4–8 teeth reduce the amount of respirable dust compared to standard masonry blades. Blades with polycrystalline diamond tips are recommended for longer cutting life.

Vacuum Dust Collection System (VDCS)

A commercially-available VDCS can be used to control dust when cutting fiber-cement board outdoors with a handheld power saw equipped with a blade of 8 inches or less.

The VDCS includes:

- A handheld circular saw with a partially enclosed saw blade equipped with either an integrated dust collection port, or a commercially available adapter installed per manufacturer's directions.
- A fiber-cement saw blade less than 8 inches in diameter.
- A vacuum that is recommended by the tool manufacturer with enough air flow to capture dust at the cutting point. Use a vacuum rated at 80 cubic feet per minute or higher for effective capture.
- Filter with a 99 percent or greater efficiency in the vacuum exhaust. HEPA filters may be used but are not required. For longer filter life, use of a disposable filter bag or cyclone pre-filter is recommended.
- A vacuum exhaust hose capable of providing the airflow recommended by the tool manufacturer. A 1.25" to 2" diameter vacuum hose is typically adequate.

Photo courtesy of NIOSH

Worker cutting fiber-cement board outdoors using a handheld power saw with a vacuum dust collection system. The dust collection system consists of a saw with a partially enclosed blade, vacuum hose, and dust collector positioned between the saw horses. Note that while this system is effective at controlling dust, some dust is still visible.

A VDCS is most effective when workers are properly trained and use good work practices. Focus on the following areas:

- **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. For best results, use a vacuum with an actuator switch that allows the vacuum to be powered on and off using the saw.
- **Change** vacuum-collection bags at least as often as the manufacturer recommends.
- **Set up** a regular schedule for maintenance.
- **Avoid** exposure to dust when changing vacuum bags and cleaning or replacing air filters.

Compressed Air. Unless there is a ventilation system that effectively captures the dust cloud, do not use compressed air or blowers to clean surfaces, clothing, or filters because it can increase exposure to silica. Instead, clean only with a HEPA filter-equipped vacuum or by wet methods.

Respiratory Protection

When properly used, a VDCS can effectively control silica dust. Therefore, Table 1 does not require use of respiratory protection when cutting fiber-cement board **outdoors** using a handheld power saw with a blade 8 inches or smaller in diameter. For **indoor** use**,** or with blades **larger** than 8 inches, Table 1 does not apply and the employers must conduct an exposure assessment and may need to take additional action, including the implementation of a respiratory protection program.

Additional Information

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Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

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U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

DSG FS-3927 12/2017

OSHA® FactSheet

CONTROL SILICA DUST
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CONTROL OF SILICA DUST IN CONSTRUCTION
Stationary Masonry Saws

Using a stationary masonry saw to cut bricks, concrete blocks, pavers, or other silica-containing materials can generate *respirable crystalline silica* dust. When inhaled over time, 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 stationary masonry saws as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153.

Engineering Control Method: Water applied continuously to the saw blade

Wet Cutting

When using a stationary masonry saw, wet cutting with an integrated water delivery system that continuously feeds water to the blade is an effective way to reduce exposure to silica dust. Many stationary masonry saws come equipped with a water basin that holds several gallons of water. A pump recirculates the water through a nozzle that directs a continuous stream onto the blade where it wets the material being cut and reduces the amount of dust generated.

Photo courtesy of OSHA

A worker cutting masonry block on a stationary masonry saw that continuously feeds water to the blade.

The saw must be operated and maintained in accordance with the manufacturer's instructions to minimize dust emissions. Focus on the following areas:

- **Check** that hoses are securely connected and are not cracked or broken.
- **Ensuring** that water flows at the rates recommended by the manufacturer. Water flow rates must be sufficient to minimize the release of visible dust.
- **Adjust** nozzles so that water goes to the blade and wets the cutting area.
- **Rinsing or replacing** water filters at recommended intervals.
- **Replace** basin water when it gets gritty or begins to silt up with dust.
- **Inspect** the saw blade before use to be sure it is in good condition and does not show excessive wear.

Indoors or in Enclosed Areas

Wet cutting indoors or in enclosed areas may not reliably keep silica exposures low, so extra ventilation or a means of exhaust may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- Exhaust trunks
- Portable exhaust fans
- Air ducts
- Other means of mechanical ventilation

Ensure air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows. Position the ventilation to move contaminated air away from the workers' breathing zones.

Electrical Safety. Where water is used to control dust, electrical safety is a particular concern. Use ground-fault circuit interrupters (GFCIs) and watertight, sealable electrical connectors for electric tools and equipment on construction sites.

Vacuum Dust Collection System (VDCS)

Some stationary masonry saws come equipped with a VDCS to capture the dust generated when sawing. For situations in which wet methods are not feasible, employers using a VDCS to control the dust must conduct an exposure assessment and may need to take additional action.

Respiratory Protection

When properly used, wet methods can effectively control silica dust. Therefore, Table 1 in the silica standard does not require use of respiratory protection when using wet methods for stationary masonry saws.

For stationary saws used with a VDCS by employers not utilizing Table 1 control methods, respiratory protection may be required if exposure monitoring results indicate employee exposures above the permissible exposure limit (PEL) of 50 $\mu g/m^3$, calculated as an 8-hour time-weighted average. When using VDCS in these conditions, employers must put in place a written respiratory protection program in accordance with OSHA's Respiratory Protection standard 29 CFR 1910.134.

Additional Information

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DSG FS-3631 12/2017

OSHA® FactSheet

CONTROL SILICA DUST
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CONTROL OF SILICA DUST IN CONSTRUCTION

Jackhammers or Handheld Powered Chipping Tools

The use of a jackhammer or handheld power chipping tools to break or demolish concrete, stone, masonry or other silica-containing materials can generate *respirable crystalline silica* dust. When inhaled over time, 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 jackhammers or handheld powered chipping tools as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153.

Engineering Control Method: Water applied continuously to the impact point ***OR*** Shroud with Vacuum Dust Collection System

Two methods for controlling dust when using jackhammers or powered chipping tools are: (1) continuously feed water to the point of impact; or (2) use a shroud or cowling with a vacuum dust collection system.

Wet Methods

When jackhammering, wetting must occur with a continuous stream or spray of water at the point where the jackhammer's tip strikes the surface material. Employers may use manual spraying or water- spray systems. Under either approach, water must be applied at a flow rate sufficient to minimize the release of visible dust.

Manual Spraying. One option for applying water when jackhammering is to have one worker direct a stream or spray of water at the impact point while another worker operates the jackhammer or powered chipping tool. A portable sprayer with a nozzle can be used for this job.

Electrical Safety. Where water is used to control dust, electrical safety is a particular concern. Use ground-fault circuit interrupters (GFCIs) and watertight, sealable electrical connectors for electric tools and equipment on construction sites.

Photo courtesy of OSHA

One worker applies water using a portable sprayer to suppress dust while the other jackhammers.

Only wetting the surface is not sufficient. Continuous water application either streamed or sprayed at the point where the jackhammer or handheld powered chipping tool breaks the surface is necessary because as the tool breaks through the surface, dry materials below are disturbed, which can produce dust.

Water-Spray Systems. Spray nozzles aimed at the tip of the tool on jackhammers and handheld powered chipping tools can lower silica exposures. Existing equipment can be retrofitted. The

National Institute for Occupational Safety and Health (NIOSH) has developed designs for a water-spray retrofit system for jackhammers. See NIOSH's design at: www.cdc.gov/niosh/docs/wp-solutions/2008-127/pdfs/2008-127.pdf.

Employers are responsible for keeping equipment in good working condition to minimize dust. Workers must receive training on how to use dust suppression equipment.

- ***Dust and debris can clog spray nozzles.*** Check the nozzle frequently. Observe the water spray to be sure it is directed at the point of impact. Clean or change if the nozzle is dripping or spurting.
- ***Take steps to provide consistent water flow.*** Make sure there is an adequate supply of water. Prevent kinked hoses, heavy equipment, or other vehicle traffic from running over hoses, and identify other potential blockages and impediments that could cause a drop in water pressure.
- ***The spray angle is critical.*** Check the water-spray angle frequently. Make sure the spray is focused on the breakpoint and the spray is wetting the dust before it spreads away from the tip of the hammer.

Photo courtesy of NIOSH

A worker chips concrete with a jackhammer using a water-spray attachment to control dust.

Clean up any slurry produced to prevent the slurry from drying and releasing silica dust into the air. Wet slurry can be cleaned up using, for example, shovels or a wet vacuum equipped with a HEPA filter.

Vacuum Dust Collection System (VDCS)

Employers may use commercially available VDCSs for jackhammers and handheld powered chipping tools to reduce silica exposure. A VDCS includes a:

- hood or shroud for the tool that is recommended by the manufacturer;
- vacuum meeting the specifications recommended by the tool manufacturer, with enough suction to capture dust at the cutting point;
- dust collector equipped with a filter efficiency of 99 percent or greater and a filter-cleaning mechanism; and
- vacuum exhaust hose capable of providing the airflow recommended by the tool manufacturer. A 1.5" to 2" diameter vacuum exhaust hose is typically adequate.

Photo courtesy of Stanley Black and Decker

Jackhammer equipped with VDCS. Shroud around hammer connects to the vacuum on the right.

The tool and VDCS must be operated and maintained in accordance with manufacturers' instructions to minimize dust emissions. Focus on the following areas:

- **Keep** the vacuum hose clear and free of debris, kinks and tight bends.
- **Change** vacuum-collection bags as needed or at least as often as the manufacturer recommends. Do not over fill the bag.
- **Set** a regular schedule for maintenance and filter cleaning of the VDCS.
- **Avoid** exposure to dust when changing vacuum bags and cleaning or replacing air filters.

Indoors or in Enclosed Areas

When jackhammers or chipping tools are used indoors or in an enclosed area, wet methods or a VDCS may not reliably keep exposure low. Extra ventilation may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- Exhaust trunks
- Portable exhaust fans
- Air ducts
- Other means of mechanical ventilation

Ensure that air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows.

Position the ventilation to move contaminated air away from the workers' breathing zones.

Use of Compressed Air. Unless there is a ventilation system that effectively captures the dust cloud, do not use compressed air or blowers to clean surfaces, clothing or filters because it can increase exposure to silica. Instead, clean with a HEPA filter-equipped vacuum or by wet methods.

Respiratory Protection

In addition to using wet methods or a VDCS, the use of respiratory protection with a minimum Assigned Protection Factor **(APF) of 10** is required whenever jackhammers or handheld powered chipping tools are used **indoors or in an enclosed** area. APF 10 respirators are also required when jackhammers or handheld powered chipping tools are used outdoors for **more than 4 hours** per shift.

When respirators are required, employers must put in place a written respiratory protection program in accordance with OSHA's Respiratory Protection standard 29 CFR 1910.134.

Additional Information

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- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

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OSHA® FactSheet

CONTROL SILICA DUST
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CONTROL OF SILICA DUST IN CONSTRUCTION

Handheld Grinders for Tasks Other Than Mortar Removal

The use of a handheld grinder to smooth or cut the surfaces of concrete, masonry or 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 control that can be used to minimize the amount of airborne dust when using handheld grinders for uses other than mortar removal as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153.

Engineering Control Method: Water applied continuously to the grinding wheel ***OR*** Vacuum Dust Collection System

Two methods for controlling dust when operating handheld grinders for smoothing or cutting surfaces, and uses other than mortar removal are: (1) use a grinder equipped with an integrated water delivery system (outdoors only); or (2) use a grinder equipped with a commercially available shroud and vacuum dust collection system. The grinder must be operated and maintained in accordance with the manufacturer's instructions to minimize dust emissions.

Wet Methods

Grinders equipped with an integrated water delivery system can be used to control dust when cutting, grinding, or polishing granite, concrete or other materials containing crystalline silica outdoors. A water faucet or pressurized container can be used to supply a constant spray of water to the grinding wheel. When used outdoors, water-fed grinders can control dust on uneven surfaces and near corners and edges more effectively than vacuum dust collection systems.

Electrical Safety. Where water is used to control dust, electrical safety is a particular concern. Use ground-fault circuit interrupters (GFCIs) and watertight, sealable electrical connectors for electric tools and equipment on construction sites.

Photo courtesy of OSHA

Example of a handheld grinder with integrated water delivery system.

Make sure to:

- **Check** that hoses are securely connected and are not cracked or broken.
- **Adjust** nozzles so that water goes to the grinding surface or cut point. Water flow rates must be sufficient to minimize the release of visible dust.
- **Set** a regular schedule for maintenance and cleaning of the tool and control.

Clean up any slurry produced to prevent the slurry from drying and releasing silica dust into the air. Wet slurry can be cleaned up using, for example, shovels or a wet vacuum equipped with a HEPA filter.

Vacuum Dust Collection System (VDCS)

Employers can also comply with Table 1 in the silica standard by using a VDCS to control dust when using a handheld grinder. Use a:

- Commercially available shroud and dust collection system on the grinding wheel appropriate for the grinder and wheel size.
- Vacuum that provides at least 25 cubic feet per minute (cfm) of airflow per inch of blade to capture dust at the point of grinding. For example, a 5" grinding wheel would require a rating of 125 cfm of air flow or more for effective capture.
- Vacuum equipped with a cyclonic pre-separator or filter- cleaning mechanism with a filter that has 99 percent or greater collection efficiency for respirable-sized particles.
- Vacuum exhaust hose capable of providing the airflow recommended by the tool manufacturer. A 1.5" to 2" diameter vacuum exhaust hose is typically adequate.

Make sure to:

- **Keep** the vacuum hose clear and free of debris, kinks, and tight bends.
- **Follow** the equipment manufacturer's directions on how to reduce dust buildup on the filter.
- **Change** vacuum-collection bags as directed by the manufacturer. **Do not overfill the bag.**
- **Set** a regular schedule for maintenance and filter cleaning of the drill and VDCS.
- **Avoid** exposure to dust when changing vacuum bags and cleaning or replacing air filters.

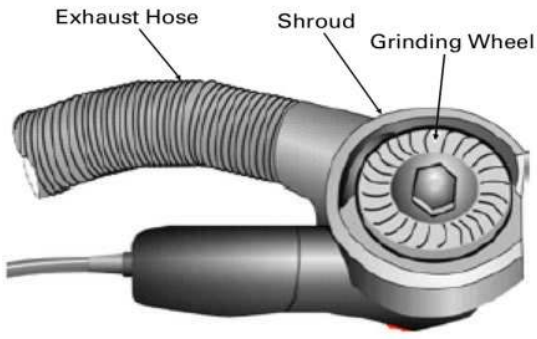

Illustration courtesy of NIOSH

Detail of grinder with vacuum dust collection system attachment.

Respiratory Protection

When properly used, wet methods can effectively control exposure to silica dust. Therefore, Table 1 does not require the use of respiratory protection when operating handheld grinders outdoors using wet methods.

When using a VDCS, respiratory protection with a minimum Assigned Protection Factor (**APF) of 10** is required whenever handheld grinders are used **indoors or in enclosed** areas for **more than 4 hours** per shift.

When respirators are required, employers must put in place a written respiratory protection program in accordance with OSHA's Respiratory Protection Standard 29 CFR 1910.134.

Use of Compressed Air: Unless there is a ventilation system that effectively captures the dust cloud, do not use compressed air or blowers to clean surfaces, clothing or filters because it can increase exposure to silica. Instead, clean only with a HEPA filter-equipped vacuum or by wet methods.

Indoors or in Enclosed Areas

Using a handheld grinder with a VDCS indoors or in an enclosed area may not be relied on to keep exposure low, so extra ventilation may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- Exhaust trunks
- Portable fans
- Air ducts
- Other means of mechanical ventilation

Ensure air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows. Position the ventilation to move contaminated air away from the workers' breathing zones.

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.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information, see OSHA's Workers page.

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.

U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

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