BY CHRIS ERMIDES

Working Safely With Silica Dust

You've likely heard by now that OSHA updated its rule on acceptable exposure limits to silica dust. If your response to this news is to groan, slap your forehead, and lament "another regulation," you're not alone. The update went into effect this past September and was most recently challenged in federal appeals court; the challenge was rejected essentially because the court found OSHA's standards to be economically and technically feasible to carry out.

Putting aside the term "rule" and "OSHA" for a moment, consider what silica dust is and why it is dangerous. Silica is the dust form of silicon (Si), which is the second most common element on Earth (oxygen being first and aluminum being third). According to OSHA, "Inhaling very small ("respirable") crystalline silica particles causes multiple diseases, including silicosis, an incurable lung disease that can lead to disability and death. Respirable crystalline silica also causes lung cancer, chronic obstructive pulmonary disease (COPD), and kidney disease."

OSHA first recognized the hazard by implementing a rule in 1971 based on data that was gathered in 1960 and earlier. Since 1971, OSHA has discovered that the limits it set weren't adequately protecting workers, and it also acknowledged that its path to compliance wasn't easy to follow. According to silica-safe.org, a site run by the Center for Construction Research and Training, silica can be found in the following materials: asphalt, brick, cement, concrete, drywall, grout, mortar, stone, sand, and tile.

The new rule drops the acceptable exposure over an eight-hour day from 250 micrograms per cubic meter of air to 50 micrograms. How big is that? It equates to about 1/20 of a grain of table salt. Think about the last time you drilled a hole in concrete, cut fiber cement, or feathered the edge of tile with your grinder. Within seconds, you produced way more than that amount of dust. Not all of it went into your lungs, obviously, but over the course of an eight-hour work day, or over the course of several days, it adds up.

The issue is much more prevalent in certain commercial industries that deal with concrete and rock all day every day, but if you do any work at all with the materials listed above, you are at risk of exposure. In an effort to help with compliance for smaller companies and independent contractors, OSHA has created the Small Entity Compliance Guide (publication OSHA3902; osha.gov). It outlines in great detail how to comply with the rule. Here are some of the highlights.

HOW TO COMPLY

OSHA offers several ways to comply, including following a prescriptive path in "Table 1" of the rule (see OSHA 3902). The path provided there is the simplest and most manageable for smaller companies that don't work with materials that produce respirable silica in ample amounts. Table 1 lists the 18 most commonly performed tasks that produce respirable silica, including cutting

Respirators are not enough. OSHA offers two compliance paths: "Table 1" from the rule, and "Objective Data" based on testing performed by respective tool manufacturers. Respirators aren't often needed within either compliance path, while dust-control methods almost always are.

When a respirator is required, Table 1 indicates whether it needs to be rated APF 10 or, in some cases, APF 25. Some dust-control methods, like the grinder shroud and dust extractor shown here, might still require the use of a respirator depending upon the duration of the task. Grinder shrouds, like this one from Metabo, are becoming readily available from most power-tool manufacturers.

Photos courtesy of the manufacturers

and drilling concrete as well as working with fiber-cement products (siding and tile backerboard). Within the table, OSHA breaks down exposure limits to time frames: less than or equal to four hours, and more than four hours.

Table 1 is not the only compliance path. Users can also use Objective Data provided by tool manufacturers. Most manufacturers of concrete working tools have excellent guides on their websites concerning compliance. While this may be perceived by some as a marketing ploy, it's not; the resources spell out how each of their respective products fulfills the OSHA regulation and indicates whether compliance is via Table 1 or Objective Data.

MOST SAWS REQUIRE WATER

Table 1 spells out several cutting tasks that require everything from handheld cutoff saws to riding saws. To be compliant, no matter what diameter blade you're using, and no matter if you're cutting indoors or outdoors, the rule requires that the saw be equipped with an integrated water-delivery system that feeds water continuously to the blade. An important note here is that the delivery system must be specifically designed commercially for the type of tool you're using. So, you can't make jobsite modifications to tools or use methods like spraying the blade—or the concrete, block, brick, or whatever material you're cutting—with water and be considered in compliance (or even protected).

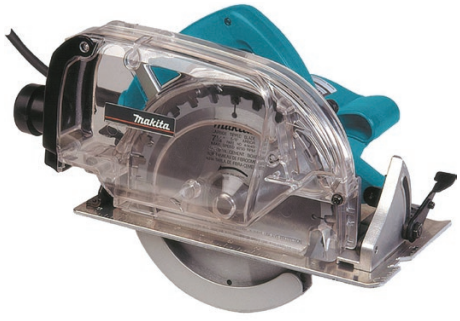
As you well know, commercially available saws are typically equipped with a hose connection. Skilsaw sells a saw called the Medusaw (now available as a walk-behind saw as well) that is a redesigned Skilsaw 77 equipped for cutting concrete and masonry. The problem here, as with any saw that has onboard hose hookup, is that it requires a water source.

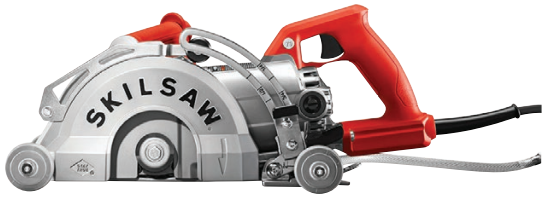
There are systems available for when a water source isn't readily present. Several manufacturers have a pressurized tank system for this purpose. Hilti has an add-on pump kit that can draw water from a large bucket. This works for a couple of the Hilti saws in situations when you don't have running water.

GRINDERS NEED WATER OR DUST SHROUDS

Mortar removal is spelled out in its own step within Table 1—wherein you're allowed to use a grinder equipped with a commercially available water-delivery system or with a commercially available shroud and dust-collection system. Most manufacturers that make grinders now have these shrouds and dust-collection systems available. You can purchase the shroud separately as a retrofit for many grinders—both cordless and corded. You can purchase it as part of a kit with a grinder, as well. For other tasks, like surfacing concrete or cutting tile, you can use either a water or a dust-collection approach. However, there are other parameters for both approaches, so be sure to read Table 1 carefully.

In either scenario, the dust-collection system must provide at least 25 cfm of air flow per inch of wheel diameter, have a filter that is 99% efficient or greater, and use either a cyclonic pre-separator or a filter-cleaning mechanism. Cyclonic pre-separators are becoming more widely available—though typically only worth an investment





Cutting options vary. The most straightforward path to compliance when you're cutting concrete or masonry is to use a wet cut-off saw. The Hilti DSH-700 (top) has an add-on water pump feature that complies where running water is not available. Cutting fiber-cement products like siding and backerboard should be done outdoors in a way that does not create dust. If a saw is used, it must be equipped with a dust shroud, like the one on the Makita (second from top). A popular misconception is that the dust extractor in this scenario must be equipped with a HEPA filter; it does not. But the extractor must be equipped with a filter that is 99% efficient or greater. Skilsaw's Medusaw (above) complies with Table 1 when used with its water-delivery system. But the saw also complies via the Objective Data component of the rule if used with a dust extractor according to Skilsaw's recommendations.

Drilling options. Several other tool manufacturers offer inexpensive shrouds designed to contain silica dust. When you're drilling overhead, this shroud from Milwaukee (top) can be emptied and reused, or the tool can be hooked up to a dust extractor. Most tool manufacturers offer Table-1-compliant, onboard attachments, like this DeWalt shroud (second from top), which is designed to contain dust, as well as pull dust away from the hole. Other shrouds, like the Bosch (above right), hook up directly to a dust extractor. These shrouds suction to the work surface, contain the dust, and pull it away at the same time. Hollow-core drill bits (not shown) are also available that connect directly to the dust extractor and remove dust as the hole is drilled. HEPA-equipped dust extractors, like this new model from Hitachi (above left), are available in various sizes and cfm ratings to comply with Table 1.

if you're doing significant amounts of this work. Metabo, for example, has one coming out in April that is HEPA rated and costs $2,500. If you do only some mortar removal, cutting, or surface grinding with a grinder, or use a grinder to cut tile or fiber cement, a dust extractor with filter cleaning might be the most economical approach. Depending upon features, size, and other specs, you can purchase a dust extractor for anywhere from several hundred to a couple of thousand dollars. If the dust extractor doesn't have automatic filter cleaning, look for one that has an onboard gauge that indicates when the system is getting full and needs to be cleaned.

If you work with the wet method, keep in mind that the Table-1 prescriptive path requires that you clean up the slurry, as well. Dried slurry turns into dust, which then requires a HEPA filter to adequately handle. The OSHA3902 publication has some good guidance on containing and managing slurry, particularly in freezing temperatures.

DRILLING REQUIRES DUST CONTROL OR COLLECTION

With the exception of core drilling, which requires an integrated water-delivery system, all drilling tasks into concrete, masonry, and other materials that produce silica dust require a dust-collection system that complies with Table 1. Some manufacturers have products that aren't specifically Table-1 compliant, but provide the Objective Data required to prove they keep the exposure limit below OSHA's limits. One example is Milwaukee's SDS Plus Dust Trap, which captures dust while drilling holes up to 7/8 inch in diameter by 4 inches deep. When attached to a dust extractor, the Dust Trap becomes Table-1 compliant, but on its own it fulfills the Objective Data component of the rule. A shroud like this is by far your least expensive option if you don't often drill holes in concrete or mortar; it sells for about $20.

Another less expensive option, if you already own a HEPA-rated extractor and don't want to invest in an entire setup, is a hollow-core bit. These are available from many tool manufacturers in a wide range of sizes and sell in the $80 range, depending on size and brand. When using this type of bit, you need a HEPA-rated filter in the dust extractor that is Table-1 compliant.

Dust shrouds that encircle the bit near the work surface are available from all of the manufacturers. These shrouds keep the dust from becoming airborne and connect to a dust extractor that's equipped with a HEPA-rated filter. The shrouds adhere via suction directly to the surface being drilled once the dust extractor is turned on.

If you drill a lot of holes and have bought into a battery platform, or if you already own a cordless rotary hammer, there are commercially available shrouds that attach directly to the tool. These shrouds are like having an onboard dust extractor and include a filter. They are powered by the tool's battery. Some manufacturer's products are Table-1 compliant, while others comply with the OSHA rule by providing Objective Data about that specific setup.

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