CLEAN AIR FOR JOB SITE SAFETY

All contractors need to be aware of the increased importance of dust suppression in the work place. Not only is it becoming an important discussion in the construction industry because of stricter regulations, but it also has benefits that go beyond health and safety. In recent years, the concrete industry has seen an increased emphasis on concrete dust suppression and containment, both for worker safety and job-site cleanliness.

OSHA’s current National Emphasis Program on Crystalline Silica (in effect since Jan. 24, 2008), outlines stricter regulations for the contractor demanding greater dust collection on the job site. In May 2013, OSHA issued a proposed rule for crystalline silica, which includes revised PELs (Permissible Exposure Limit), and is waiting for final comments. It will become essential for the contractor to outfit tools and equipment with dust containment devices, like shrouds and vacuums, both to control the level of airborne dust that is harmful to breathe and to reduce the labor of cleaning up dust from floors, shelves, racks, counters etc., as it settles. These very fine particles can find their way far beyond the work area creating a problem when the job site is in an open business, public building or open area where dust can migrate.

Fredrik Akerman, VP of Sales and Marketing, for Ermator USA, comments that OSHA’s current silica regulations and the Renovation, Repair and Painting (RRP) Rule from two years ago show the regulations in North America are headed to where they have been for years in other parts of the world. “Equipment manufacturers, contractors and regulatory boards all need to work together to make work areas safer. New PEL ratings for the construction industry are coming and currently we don’t know how low they will go, but we all need to be pro-active in dust control”.

Manufacturers of equipment in the concrete, masonry and stone industry are responding by incorporating dust suppression systems into their equipment. Safety is a driving factor in this increased need for dust control on jobsites. By having equipment with dust collectors and shrouds attached this collection is possible. The other main reason for dust suppression and collection is to protect workers using the equipment, as well as customers and employees if the building is open during the remodel or addition. “Having vacuums connected to equipment collecting dust when working is key! Not only is the vacuums’ air flow (CFM) and water lift important, but the type of filter is crucial to collecting the smallest most harmful partials from the air. Many other vacuums are outfitted with HEPA (high efficiency particulate air) filters are 99.95 efficiency at .5 microns. But, we see this rate being reduced. Why would you let the most harmful particles escape? That’s why filters rated at 99.99 at .3 microns that are certified and tested are the norm in other parts of the world.

Also by collecting the airborne dust with air scrubbers and vacuuming up the remaining dust and debris off the floor with vacuums instead of sweeping not only controls air quality, but also saves the contractor time and labor,” states Fredrik Akerman, VP Sales and Marketing, Ermator North America.

It is crucial that contractors, manufacturers, testing companies, like CPWR, and regulatory boards like the EPA and OSHA continue to work together. On June 19-20 2013, CPWR evaluated the performance of the Ermator S26 Hepa Dust Extractor connected to TWO Bosch hand grinders with TWO, ICS Dust Director Shrouds for the tuck pointing industry.

This test was carried out as part of an ongoing project aimed at identifying and evaluating effective “local exhaust ventilation” (LEV) systems for reducing silica exposure limits during tuck pointing. The test showed use of the LEV system reduced exposure by approximately 98% which represented a 43 fold reduction. “By attaching one vacuum with a shroud to only one grinder the reduction of exposure would be even greater,” commented Fredrik Akerman.

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When larger equipment is used CFM and water lift is crucial. Vacuum shown here is 647CFM with 140” of lift.

WHEN SELECTING A VACUUM, THE CONTRACTOR NEEDS TO LOOK FOR THE FOLLOWING FEATURES:

- High quality HEPA filters that are tested and certified.
- Multi levels of filtration that includes pre-filters and pre-separators.
- Contained filter cleaning so as not to allow dust to escape when cleaning.
- Proper Cubic Feet/Minute (CFM) and water lift for the tool its being attached to.
- Accessory availability to install on the tool for collection at the source and floor tools for clean-up.
- “Auto tool trigger” features so as soon as the tool starts the dust control is activated.
- Wet and dry availability when needed based on job site conditions.
- Control of dust when changing bags with drop down systems.

Not only are the manufacturers of air extractors and accessories coming up with innovative ways to control dust, but so are the manufacturers of the equipment. A good dust collection system can only be effective if the piece of equipment (grinder) it is attached to is designed properly. Some good designs include larger multiple dust ports, for maximum lift and CFM. Small 2” ports that were on usually supplied on machines are now being expanded to 3”.

Some manufacturers making the largest 52” grinding machines are installing two 3” ports on both sides of the machine for maximum airflow. Also, low profile baffles in the equipment allow the CFM and lift of the vacuum to be concentrated closer to the floor.

This improves dust pickup and helps to maximize the effectiveness of the vacuum. Use of rubber dust skirts creates a tight seal around the entire grinding head of the machine; this helps seal off gaps and spaces that allow fine silica dust to escape into the air.

These simple features improve the overall effectiveness of the dust collection system, and make it safer for the operator and others who may be close by. Airflow design of equipment is just as important as having a good vacuum, especially when dealing with fine silica dust.

Exposure occurs during many different construction activities. The most severe exposure generally occurs during abrasive blasting with sand to remove paint and rust from bridges, tanks, concrete structures, and other surfaces. Many other construction activities beyond the typical concrete grinding, jack hammering, drilling, coring, concrete mixing, brick and concrete block cutting, sawing, and tuck pointing, add to the hazardous air quality. As an example, houses built with wood create a considerable amount of saw dust. When this type of dust is cleaned by conventional shop vacuums with non-HEPA filtration, it is pulverized and blown back into the air as an even smaller, more harmful particle size.

To understand what we are dealing with there are many reports on the hazards of concrete dust. Crystalline silica is a basic component of soil, sand, granite, and many other minerals.

Quartz is the most common form of crystalline silica. Cristobalite and tridymite are two other forms of crystalline silica. All three forms may become respirable sized particles when workers chip, cut, drill, or grind objects that contain crystalline silica. Each year, about 1.7 million workers in the United States are exposed to silica dust and run the risk of developing silicosis, lung cancer and other debilitating diseases. Public health experts estimate that 280 workers die each year from silicosis and thousands more develop silicosis as a result of workplace exposures. Crystalline silica has been classified as a human lung carcinogen and silica exposure remains a serious threat to nearly 2 million U.S. workers, including more than 100,000 workers in high risk jobs such as abrasive blasting, foundry work, concrete, rock and stone cutting, coring and drilling, quarry work and tunneling. Breathing crystalline silica dust can cause silicosis, which in severe cases can be disabling, or even fatal. The respirable silica dust enters the lungs and causes the formation of scar tissue, thus reducing the lungs’ ability to take in oxygen. There is no cure for silicosis.

Since silicosis affects lung function, it makes one more susceptible to lung infections like tuberculosis. The most severe exposures to crystalline silica result from abrasive blasting, which is done to clean and smooth irregularities from molds, jewelry, and foundry castings.

Also, finishing tombstones, etching or frosting glass, removing paint, oils, rust, or dirt from objects that need to be repainted or treated are dangerous environments. Other exposures to silica dust occur in cement and brick manufacturing, asphalt pavement manufacturing, china and ceramic manufacturing, tool and die, steel and foundry industries. Crystalline silica is used in manufacturing, household abrasives, adhesives, paints, soaps, and glass.

Additionally, crystalline silica exposure occurs in the maintenance, repair and replacement of refractory brick furnace linings. In the maritime industry, shipyard employees are exposed to silica primarily in abrasive blasting operations to remove paint, to clean and prepare steel hulls, bulkheads, decks, and tanks for paints and coatings.

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All types of surface prep equipment are being used for industries including polishing, epoxy coatings and overlays.

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OSHA has established PEL limits of the maximum amount of crystalline silica workers may be exposed to during an 8-hour work shift (29 CFR 1926.55, 1910.1000). OSHA also requires communication training for workers exposed to crystalline silica, and requires a respirator protection program until engineering controls are implemented. Additionally, OSHA has a National Emphasis Program (NEP) for Crystalline Silica exposure to identify, reduce, and eliminate health hazards associated with occupational exposures. But a proposed workplace standard on silica dust exposure from OSHA has been delayed for nearly two years as the Office of Management and Budget reviews the proposed standard.

OSHA specifies that an employer must “implement the best possible permanent solution” for reducing and/or eliminating crystalline silica dust. When silica exposure cannot be eliminated, OSHA suggests methods in controlling silica exposure when grinding, cutting, coring etc., and a fastest growing method is through mechanical means such as vacuums connected to the equipment. Also using water connected to equipment works but the slurry created is then also hazardous and can not be easily disposed of.

**SOME OF OSHA RECOMMENDATIONS FOR WHAT EMPLOYERS AND EMPLOYEES CAN DO TO PROTECT AGAINST EXPOSURES TO CRYSTALLINE SILICA ARE AS FOLLOWS:**

- Replace crystalline silica materials with safer substitutes, whenever possible.
- Provide engineering or administrative controls, where feasible, such as local exhaust ventilation, and blasting cabinets. Where necessary to reduce exposures below the PEL, use protective equipment or other protective measures.
- Installing dust collection systems onto machines or equipment that generates dust.
- Use all available work practices to control dust exposures, such as water sprays.
- Wear only a N95 NIOSH certified respirator, if respirator protection is required. Do not alter the respirator. Do not wear a tight-fitting respirator with a beard or mustache that prevents a good seal between the respirator and the face.
- Wear only a Type CE abrasive-blast supplied-air respirator for abrasive blasting.

In addition to the OSHA regulations on silica dust exposure, the EPA’s 2008 Lead RRP Rule (as amended in 2010 and 2011), aims to protect the public from lead-based paint hazards associated with renovation, repair and painting activities. Activities can create
hazardous lead dust when surfaces with lead paint, even from many decades ago, are disturbed. The rule requires workers to be certified and trained in the use of lead-safe work practices, and requires renovation, repair, and painting firms to be EPA-certified. These requirements became fully effective April 22, 2010. Under the rule, firms performing renovation, repair and painting projects that disturb lead-based paint in homes, child care facilities, and kindergartens built before 1978 must be EPA or state-certified and must use certified renovators who follow specific work practices to prevent lead contamination. This includes in-house maintenance staff and many types of outside contractors. In order to become a certified renovator, an individual must be trained by an EPA-accredited training provider. In addition to the current regulations, the EPA is giving advanced notice of the Agency’s intention to regulate the renovation, repair, and painting of public and commercial buildings under the Toxic Substances Control Act (TSCA). This notice announces the commencement of proceedings to propose lead-safe work practices and other requirements for renovations on the exteriors of public and commercial buildings and to determine whether lead-based paint hazards are created by interior renovation, repair, and painting projects in public and commercial buildings. For those renovations of the interiors of public and commercial buildings that create lead-based paint hazards, EPA will propose regulations to address these hazards.

All these new and current regulations mean manufacturers of concrete equipment for grinding, blasting, coring, cutting, and chipping need to continue working with the dust control companies to fill their customers’ needs. As of Sept. 12, 2013 the notice of proposed rulemaking for respirable crystalline silica was published in the Federal Register. OSHA invites and strongly encourages the public to participate in the process of developing a final rule through written comments and participation in public hearings. The public had until Dec. 11, 2013, to submit written comments on the proposed rule.

In many cases, contractors and manufacturers are resistant to more regulation. However, always remember “Time is Money.” They may look only at upfront cost, and not at the long term savings and advantages. Typical shop vacuums are not equipped to handle a variety of mediums and do not prevent the dust from escaping back into the air. With the right vacuum on site, labor costs are reduced by fast and easy clean up of the job site. The old ways of “shoving a broom around” is disappearing due to contractors seeing the speed and efficiency in clean up, not to mention, the health benefits to their employees and to other workers in the area. Quality products are out there with the proper multi stage filtration and approved HEPA filters. Units with pre-filters and or synthetic high filtration bags, not only collect large and small debris, but protect the vacuum motors which extend their life. Therefore, spending a little money up front saves in the long run.

It is important to remember, job site dust is not just dust. It is vital for the industry to work together to develop vacuums and attachments that adapt to all types of construction equipment, that control the dust, and to continue to meet the industry needs for “A Safer, Cleaner Jobsite!”

SUBMITTED BY: 
LYNDON KELSEY 
Western USA Sales Representative 
Ermator LLC, and Pullman Holt. 
Leading manufacturers of HEPA wet/dry vacuums and attachments, for use by professional contractors around the world.