Chemicals and Materials

Engineered Stone Countertops

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What are engineered stone countertops?

Engineered stone countertops are manufactured using crushed quartz rock, resins, additives, and other materials. Engineered stone countertops may also be referred to as artificial stone countertops, manufactured stone countertops, or quartz countertops.

Why is there a concern about exposure to dust generated from engineered stone?

The concern about engineered stone involves workers being exposed to the dust that is generated during the processing of these products. These dusts have a high silica content.

While silica occurs naturally in stone, engineered stone typically contains much higher concentrations of silica than natural stone. Engineered stone can contain up to 90 to 97% silica, whereas natural stone such as granite contains less than 45%, and marble usually contains less than 5%.

The silica dust generated from engineered stone also has different chemical and physical properties than the dust generated from natural stone, such as higher proportions of very small (nanoscale) silica particles.

Engineered stone is often lighter and easier to process than natural stone; therefore, workers may process more engineered stone countertops in a shift, which can increase their exposure. There are concerns about the potential health effects of exposure to the other components used to manufacture engineered stone, including resins, metals, and pigments.

What are the hazards to workers?

Workers involved with manufacturing, finishing, sizing, and installing engineered stone and natural stone can be at risk of exposure to silica. These workplaces include fabrication factories, shops, and installation companies.

Workers involved with maintenance and housekeeping in these workplaces or installation sites may also be at risk of silica exposure.

What are the health effects of silica dust exposure?

Activities or tasks that generate dust, such as cutting, drilling, grinding, sanding, and polishing, can cause silica dust to become airborne, and workers can breathe it in.

When inhaled, silica can cause serious health effects, including silicosis (which is an incurable lung disease), chronic obstructive pulmonary disease, and lung cancer.

Why did Australia ban engineered stoned countertops and benchtops?

Starting on July 1, 2024, Australia implemented the first ban on the manufacturing, supply, processing, and installation of engineered stone benchtops, panels, and slabs (containing at least 1% crystalline silica). Safe Work Australia states that the majority of silicosis cases that have been identified in Australia are associated with engineered stone workers. These workers are getting silicosis much quicker, and are experiencing more severe disease advancement and death rates. They also state that experts have shown that the dust from engineered stone poses unique hazards, and there is no evidence that working with engineered stone with lower concentrations of silica is safer.

What control measures help protect workers?

Employers must make sure that adequate control measures are in place to protect workers from harmful exposures to silica. In Canada, each jurisdiction has legislated exposure limits for silica which set the maximum airborne concentrations that workers can be exposed to. Some provinces and territories (e.g., Ontario) also have specific requirements for control programs. Each workplace needs to understand and follow the requirements outlined in the health and safety legislation for their jurisdiction regarding worker exposure to silica. All employers have a general duty to take all reasonable precautions to protect the health and safety of workers and should reduce exposure to as low as possible.

Workplaces involved with engineered stone work need to identify the hazards, assess the risk, and implement appropriate controls. When controlling exposure to silica dust generated from engineered stonework, follow the hierarchy of controls. Below are some examples of control measures.

Elimination and Substitution

- Using non-silica-containing or lower silica-containing alternatives

Engineering Controls

- Improving ventilation, including the use of local exhaust ventilation
- Isolating and enclosing processes that generate dust
- Improving or redesigning cutting methods, such as automated cutting, using sharper blades, and reducing the number of cuts
- Lowering the speed of machinery to reduce airborne dust (e.g., during cutting, polishing, grinding).
- Using wet methods (e.g., while cutting, grinding, cleaning) to reduce dust generation
- Using high-efficiency particulate air (HEPA) vacuum attachments on tools to capture dust

Administrative Controls

- Training and educating workers on the hazards, procedures, and control measures
- Implementing a medical surveillance program (such as chest X-rays, computed tomography (CT) scans, pulmonary lung function tests, etc.)
- Developing and enforcing safe work procedures
- Good housekeeping, including using wet methods and HEPA vacuums to capture dust, and not allowing dry sweeping or cleaning with compressed air.
- Developing and following equipment maintenance schedules
- Developing personal protective equipment (PPE) and respiratory protection programs (including fit testing and clean-shaven policy)
- Ensuring waste is properly managed and disposed

Personal Protective Equipment

- When more effective measures are not possible, are in the process of being implemented, or are unable to reduce exposures to acceptable levels, make sure workers use the appropriate personal protective equipment, including respiratory protection. Procedures for putting on or taking off respirators, cleaning and maintenance, and disposal also need to be followed.

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