



Tuckpointing: Nano-Enabled Mortar

Removing mortar with handheld grinders when tuckpointing creates dust containing respirable crystalline silica. Breathing respirable silica can cause lung cancer and scarring of the lungs. OSHA has a standard in construction for silica that includes requirements for controlling workers' silica exposure and the use of respiratory protection when removing mortar with a handheld grinder.

In some cases, mortar can contain an engineered, or intentionally created, nanomaterial such as graphene. Products that contain engineered nanomaterials are called nano-enabled and are increasingly being used in construction. Graphene and other nanomaterials can be added to mortar, concrete and other such products to make them stronger and more durable, but when workers cut, grind, or sand these nano-enabled materials, dust containing the nanoparticles gets into the air that workers breathe. Nanoparticles are very small, about 100,000 times smaller than the width of a human hair. Some animal studies suggest that graphene could be harmful to the lungs, but the risks to construction workers are not well understood.

Larry's Story

Larry is a brick mason. His job involves removing mortar from brick walls with a handheld grinder during tuckpointing. On a new job, his supervisor mentions that the mortar used was a nano-enabled product containing graphene to make it stronger so it might take longer to remove. Larry knows that removing mortar from brick walls with a handheld grinder creates a lot of dust in the air that contains respirable silica which can harm his lungs if he breathes it. He is also concerned that breathing the mortar dust with the graphene additive may be harmful to his lungs.

- ✘ How could Larry find more information about the nano-enabled mortar?
- ✘ What could be done to protect workers from breathing dust that contains crystalline silica and engineered nanomaterials like graphene?

Remember This

- Check CPWR's online inventory of more than 900 nano-enabled construction materials for products you use at <https://nano.elcosh.org>.
- Ask your employer if the product you are working with contains graphene. Look for this information on the product label or the Safety Data Sheet (SDS). Be aware that this information may not be reported by the manufacturers on labels or SDSs.
- Follow the OSHA construction respirable crystalline silica standard, 29 CFR 1926.1153, and its Table 1 for required engineering control methods and respiratory protection when using handheld grinders for mortar removal during tuckpointing.
- As required by OSHA's silica standard, use a handheld grinder equipped with a shroud on the grinding wheel and a dust collection system with a hose running to an industrial vacuum with a HEPA filter.
- CPWR researchers found that the local exhaust ventilation system on handheld grinders during tuckpointing was very effective in reducing worker exposure to graphene when used on graphene-enabled mortar.
- Your employer is responsible for providing you with the right type of respirator as part of a full respiratory protection program required by OSHA. N95 or P100 filters effectively capture nanomaterials.

How can we stay safe today?

What will we do at this worksite to prevent exposure to the dust from grinding the nano-enabled mortar?

1. _____

2. _____

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- ✘ Use a handheld grinder with an adaptable shroud on the grinding wheel and a hose connected to a vacuum system with a HEPA filter.
- ✘ Wear the respirator as required by the OSHA silica standard when removing mortar with a handheld grinder that is appropriate for the length of the mortar removal job in your shift.
- ✘ Wear a face shield or goggles to protect your eyes from the dust and hearing protection to prevent hearing loss.