CPWR TOOLBOX TALK
THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

Controlling Exposures to Ultrafine Particles

Ultrafine particles are very small—up to 100,000 times thinner than a sheet of paper. Ultrafine particles include engineered nanoparticles and incidental nanoparticles. These nano-sized particles differ in how they are created and why, as described below.

***Engineered** nanoparticles are a new type of material created for some purpose. For example, they are added to construction materials to make them lighter, stronger, or mold resistant. When workers cut, grind, sand, spray, or disturb these products, they can breathe in air containing the engineered nanoparticles.*

***Incidental** nanoparticles are not created on purpose. Diesel exhaust and welding fumes, for example, contain ultrafine particles, as does wildfire smoke.*

Research shows that exposure to small particles can have harmful effects on the heart, lungs, and nervous system. The key is to limit exposure to vapors, dusts, gases, and fumes on the job.

Mary's Story

Mary is a welder and knows that welding fumes contain tiny ultrafine particles. She wonders if being exposed to the fumes will be harmful to her lungs over time.

- **What should Mary do to avoid breathing ultrafine particles from fumes?**
- **Workers can also breathe in ultrafine particles from construction dust. What should be done to avoid breathing in ultrafine particles from dust?**

Remember This

- Tasks like welding or cutting concrete can release ultrafine particles into the air workers breathe.
- Exposure to ultrafine particles can be controlled by using ventilation and respiratory protection to limit exposure to vapors, dusts, gases, and fumes.
- Local exhaust ventilation that includes a HEPA filtered vacuum cleaner attached to power tools or positioned around welding operations capture ultrafine particles at or close to the source.
- Respirators equipped with N95 or P100 filters will capture ultrafine particles. Your employer should provide appropriate respiratory protection.
- OSHA does not have specific standards for ultrafine particles but has other standards like its respirator standard and silica standard that require employers to limit exposure to vapors, dusts, gases, and fumes.
- The National Institute for Occupational Safety and Health (NIOSH) has recommended exposure limits (RELs) for three engineered nanomaterials: carbon nanotubes, nano-sized titanium dioxide, and nano silver.
- CPWR's online inventory (http://nano.elcosh.org) provides information about the use of engineered nanoparticles in more than 900 construction products as well as guidance on controlling exposures.

How can we stay safe today?

What will we do at this worksite to control exposure to ultrafine particles in welding fumes and cement dust?

1. _____

_____

2. _____

_____

 CPWR is the research and training arm of NABTU. Production of this document was supported by cooperative agreement OH 009762 from the National Institute for Occupational Safety and Health (NIOSH). The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH.

CPWR
THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING TOOLBOX TALK

Controlling Exposures to Ultrafine Particles

- Use local exhaust ventilation equipped with a HEPA filter to capture particles and fumes at the source.
- Wear a NIOSH-approved particulate respirator when the welding vacuum system alone does not capture enough of the dust and fumes.
- Wear welder's goggles or a face shield to protect your eyes and use hearing protection to prevent hearing loss.
- Wear a welding helmet and welding gloves to prevent burns.

 Production of this document was supported by cooperative agreement OH 009762 from the National Institute for Occupational Safety and Health (NIOSH). The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH.

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING