Washington State Department of Labor & Industries

Safety and Health Alert
Nanoparticles

SHARP Safety & Health Assessment & Research for Prevention

What to do today to protect worker health

What are nanoparticles?

- Nanoparticles are so small that you can't see them. They range in size between 1 and 100 nanometers long (this is nearly a *billionth* of an inch).
- They are similar in size and shape to some asbestos fibers.
- Nanoparticles are used in research settings and industrial applications.
- Carbon nanotubes (CNTs) or carbon nanofibers (CNFs) are just 2 types of nanoparticles being studied.
- Sources of nanoparticles include
  Manufacturing: chemicals, pharmaceuticals, cosmetics, medical products, computer and electrical circuits, paints, pigments, and cement.
  Process emissions: aircraft, automobile, and diesel engines, soldering, welding, plasma cutting, powder handling, and powder and other spray coating.

How can nanoparticles harm me?

- Nanoparticles penetrate deep into the lungs when inhaled. Once inhaled, they can move through lung tissue and are not easily removed from the body. Nanoparticles can also be eaten and taken in through the skin.
- The unique physical, chemical, and electrical properties of these particles make them very reactive in the body.
- Workers exposed to nano-sized particles show respiratory problems, weakened lung function, lung diseases, and nervous system effects.
- Animal studies show that the health effects of inhaled nano-sized particles and fibers are similar to those for asbestos fibers.

What symptoms are linked to exposure?

- Irritated eyes, nose, throat, or respiratory tract.
- Shortness of breath, coughing, or wheezing.
- Irritated or red skin, itching, or rash.

What do I need to do?

Reduce Exposure

- When possible, use a less hazardous or non-hazardous material that does not generate nanoparticles.
- Select, install, and maintain appropriate local exhaust ventilation (LEV) or an effective exhaust hood. Check its performance frequently.
- Enclose and ventilate the entire process.
- Use high efficiency particulate air (HEPA) filters to clean the air.

Use Safe Work Practices

- Routinely evaluate airborne exposures to ensure that control measures are working properly and that worker exposures are below the NIOSH recommended exposure limit of 7.0 µg/m^3.
- Provide facilities for hand-washing and encourage workers to make use of these facilities before eating, smoking, or leaving the worksite.

Train Users

- Train workers to identify nanoparticle sources, exposures, and hazards.
- Instruct workers to use and check ventilation controls.
- Train workers to use personal protective equipment properly.
- Advise workers to report health symptoms to their supervisor and doctor.

Provide the Right Personal Protective Equipment (PPE)

- Lungs: Use NIOSH-approved N95 respirators to protect workers from particles or an R- or P-95 filter if oil or mist is present. For high exposures, use a full-face NIOSH-approved respirator.
- Skin: Use light-colored gloves and overalls or lab coats to prevent skin contact and help visualize contamination.
- Eyes: Use safety goggles.

Where can I get help?

- Contact DOSH Consultation at 206-515-2837 for all safety and health concerns or at www.lni.wa.gov/Safety/Basics/Assistance
- Contact SHARP at 1-888-667-4277or at http://www.lni.wa.gov/Safety/Research/
- WA State Department of Labor and Industries nanotechnology resources. http://www.lni.wa.gov/Safety/Topics/AtoZ/nanotechnology/default.asp
- Approaches to Safe Nanotechnology: Managing the Health and Safety Concerns Associated with Engineered Nanomaterials. http://www.cdc.gov/niosh/topics/nanotech/safenano/