

Controlling Health Hazards When Working with Nanomaterials: Questions to Ask Before You Start

Here are some questions you should ask yourself before starting work with nanomaterials.

Here are some options you can use to reduce exposures to nanomaterials in the workplace. These options correspond with the questions on the left.

(1) FORM 🛵

Have you done a job hazard analysis? What is the physical form of the nanomaterial? How much are you using? Can you reduce exposure to the nanomaterial by changing its form (for example, putting powder into a solution) or reducing the amount you are using?

DRY POWDER

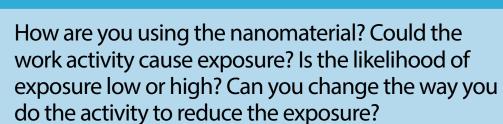
(typically highest potential for exposure)

SUSPENDED IN LIQUID

PHYSICALLY BOUND/ **ENCAPSULATED**

(typically lowest potential for exposure)

(2) WORK ACTIVITY



Applies to Dry Powder Nanomaterials

- Higher potential for exposure: Dumping bags of powder, bagging or sieving of products
- Lower potential for exposure: Scooping/weighing of product, transporting containers with light surface contamination or closed barrels/bottles/bags

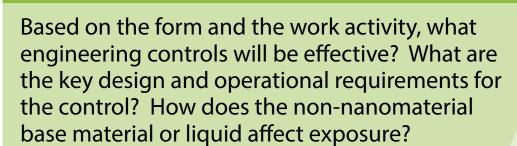
Applies to Nanomaterial Suspended in Liquids

- Higher potential for exposure: Spraying, open top sonication, producing a mist
- Lower potential for exposure: Cleaning up a spill, pipetting small amounts, brushing

Applies to Physically Bound/Encapsulated Nanomaterial

- Higher potential for exposure: Cutting, grinding, sanding, drilling, abrasive blasting, thermal release
- Lower potential for exposure: Manual cutting and sanding, painting with a roller or brush

(3) ENGINEERING CONTROLS



Applies to Dry Powder Nanomaterials

- Chemical fume hood
- Glove box
- Nanomaterial handling enclosure
- Ventilated bagging or dumping stations
- High-efficiency particulate air (HEPA)-filtered local exhaust ventilation

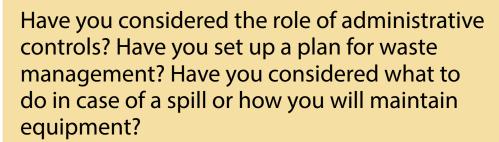
Applies to Nanomaterial Suspended in Liquids

- Chemical fume hood
- Glove box
- Nanomaterial handling enclosure
- Local exhaust ventilation
- Ventilated spray booth

Applies to Physically Bound/Encapsulated Nanomaterial

- Chemical fume hood
- Wet cutting/machining
- Glove box
- Ventilated tool shroud
- Local exhaust ventilation
- Blasting cabinet
- Downdraft table

(4) ADMINISTRATIVE CONTROLS

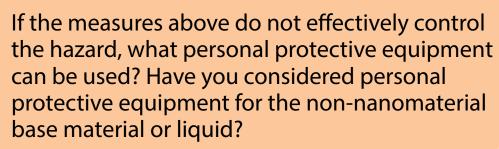


- Establish a chemical hygiene plan
- Perform routine housekeeping
- Train workers
- Use signs and labels
- Restrict access to areas are used

Applies to All Nanomaterial Forms

- cleaning materials/gloves) containment in compliance with all applicable federal, state, and local regulations
- Handle and dispose of all
 Use sealed/closed bags or waste materials (including containers, and secondary
 - Label containers, such as "contains nanoscale titanium dioxide"
- Wet wipe or use a HEPA-filtered vacuum
- Do not dry sweep or use compressed air
- Incorporate nanomaterial safety into existing programs such as hazard communication

(5) PERSONAL PROTECTIVE **EQUIPMENT**



- Nitrile or chemical resistant gloves
- Lab coat or coveralls
- Safety glasses, goggles, or face shield

Applies to All Nanomaterial Forms

- Respiratory protection when indicated and engineering controls cannot control exposures, and in accordance with federal regulations (29 CFR 1910.134)
- NIOSH guidance on respirators can be found at www.cdc.gov/niosh/topics/respirators/
- Use personal protective equipment during spill cleanups and equipment maintenance

