Potential for worker exposure to nano-size titanium dioxide above the recommended limit when spraying paint

Exposure to airborne nano-titanium dioxide during airless spray painting and sanding


Key Findings

- Characterization of the paint before testing indicated that most of the TiO\(_2\) primary particles in the paint were nano-size and bound together to form larger structures, called agglomerates.
- Sonication in acetone caused the nanoparticles to separate, raising the question of whether paint thinners and mechanical mixing could mimic this effect observed in the lab.
- Individual nanoparticles were detected by particle counters during spraying and sanding but could not be confirmed by electron microscopy.
- Exposures during sanding were below the NIOSH REL. Dust levels were relatively low, and local exhaust ventilation significantly reduced the number of airborne nanoparticles.
- The researchers concluded that workers could potentially be exposed to levels above the NIOSH REL for ultrafine TiO\(_2\) when applying the paint with an airless sprayer.
- They recommended that employers and industrial hygienists should characterize exposures and use the hierarchy of controls to protect the health of employees.
- Future research should consider whether chemicals commonly used in construction, including those found in paint thinners, could impact occupational exposure to nanomaterials in paints.