

Respirator performance against nanoparticles under laboratory and workplace settings - FY17 (921044M)

Objective

To validate that NIOSH-approved air purifying respirators provide expected levels of protection commensurate with their assigned protection factor for workers handling nanoparticles.



Applicable Standards

- 42 CFR, ASTM E56, ISO TC 229

Key Partners

- NIOSH NTRC – Funding
- NIOSH-Cincinnati – Equipment design and workplace protection factor studies
- Larry Janssen
- AIHA RPC

Stakeholders

- Respirator users
- Industrial hygienists
- Respirator manufacturers
- Filter media manufacturers
- Nanotechnology companies

Project scope

- 1) Measure SWPFs for N95 and P100 FFRs and elastomeric half-mask respirators, as a function of particle size (20–400 nm size range) donned by subjects exposed to salt aerosols in an exposure chamber
- 2) Determine if P100-class provides better protection than N95-class respirators under laboratory conditions
- 3) Validate that field portable instruments can be used to obtain count-based WPFs
- 4) Determine if respirators provide the expected level of protection to workers in real workplaces where engineered nanoparticles are produced & handled

Milestones FY17

- Q1: Completed data collection on Phase 4 – SWPF study of PAPRs
- Q2: Completed statistical analyses of Phase 4 data
- Q3: Complete one presentation at AIHce
- Q4: Submit a manuscript to journal and start Phase 3 data collection

Outputs

- Manuscript published or submitted to peer-reviewed journals (7)
- Manuscripts in the preparation process (2)
- Presentations to stakeholders or conferences (9)
- Standards committee meetings & public meetings (0)

Outcomes

- Experimental data from project will be used in NIOSH, OSHA, ASTM, & ISO guidelines for worker protection against airborne nanoparticles
- Other researchers will use the methodology developed for nanoparticles to conduct additional WPF studies to validate the performance of other types of respiratory protective devices