

Development of PPE Ensemble Test Methods FY15 (927Z1NQ)

Objective

To develop innovative test methods for evaluating the integrity of protective clothing and ensembles against particulate challenges



MPAS with QCM detection system



Multiplex circuit with QCM digital controller

Applicable Standards

- ASTM F23, E56
- NFPA 1994, 1971, 1951

Key Partners

- NIOSH NTRC
- Washington University in St. Louis

Stakeholders

- PPE manufacturers
- Firefighters
- NIOSH NTRC
- ASTM
- NFPA
- IAFF



Project Scope

- Task 1. Optimization of the multidomain magnetic passive aerosol sampler (MPAS) design
- Task 2. Development and validation of a standardized bench-scale particulate penetration test method

FY15 Milestones

- Q1. Complete design and fabrication of the sample rotating ring and wind tunnel flow cone
- Q2. Complete validation of multiplexed (8 channel) QCM on rotating ring via gravimetric comparison method
- Q3. Complete evaluating larger particle penetration through four fabrics at three face velocities
- Q4. Complete manuscript for internal review with a tentative title of “Development of a bench-scale particle penetration test method for protective clothing materials”

Outputs

- Manuscripts published in (5 published, one received AIHA Outstanding Aerosol Paper award, 2 more in development)
- Book chapter published (1)
- Presentations at national/international conferences and stakeholder meetings (14), three of which received Best Poster of the Section at AIHce
- Employee invention reports (2)

Outcomes

- This project has contributed to the NIOSH NTRC report titled “Approaches to Safe Nanotechnology”
- Other researchers utilize project findings to conduct further research (15 citations to date)
- This project has resulted in 2 projects funded by the NTRC
- This project has resulted in a new research proposal by Lovelace Respiratory Research Institute, which was submitted to NIOSH under an RO3 grant
- Expected outcome is to improve standards and test methods for protective clothing used for protection against inert and biological aerosols

Updated: 13 Feb 2015