Penetration of Engineering Nanomaterial Through Protective Gloves (NTRC) – FY13 (939ZXYK)

Objective

To develop test methods and determine engineered nanomaterial (ENM) penetration through protective gloves that are commonly used in the nanomaterial industry under conditions simulating occupational use.


A robotic hand system without a glove (left) and with a glove in the grabbing position (right)

Applicable Standards

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

Key Partners

- NIOSH NTRC
- Clarkson University

Stakeholders

- Glove manufacturers
- Nanomaterial industry
- NIOSH NTRC

Workers handle ENMs

Project Scope

- Task 1. Development of test methodologies for evaluating penetration of ENMs in both a dry powder and an aqueous phase and mimic workplace use conditions.
- Task 2. Evaluation of ENM penetration through nitrile and latex gloves which are most commonly used in the ENM industry.

Milestones FY13

- Q1. Completed literature review; complete identification of new equipment/instruments
- Q2. Completed a full research proposal (that is under external review); conducted experiments using fluorescently-labeled particles
- Q3. To address external review comments on the proposal and have a revised version for approval; continue experiments using both fluorescently- and radio- labeled particles
- Q4. To start the development of test methods for determining ENM penetration through gloves

Expected Outputs

- Manuscripts published in peer-reviewed journals
- Presentations at national/international conferences and stakeholder meetings
- Final report by Clarkson University
- Employee invention report
- ASTM standard

Expected Outcomes

- This project will contribute to NIOSH NTRC report titled “Approaches to Safe Nanotechnology: Managing the Health and Safety Concerns Associated with Engineered Nanomaterials”.
- This project will improve standards and test methods for protective gloves used for workers handling ENMs in nanomaterial industry.