Development and Validation of Physiological Performance Models to Correlate the Effect of Ensemble THL - FY12 (939ZUNJ)

Objective

To provide the standards organizations with a sound physiological basis for setting THL values in current and future PPE performance standards with a focus on CBRN standards

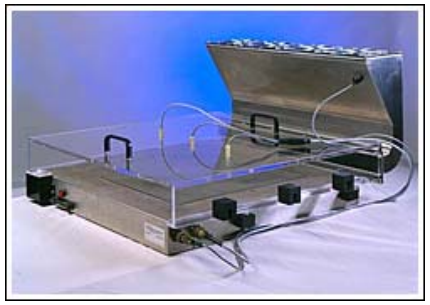

Fig. 1 Total Heat Loss Apparatus

Fig. 2 NPPTL Physiology Lab

Applicable Standards

- NFPA Protective Clothing Standards –1994 (CBRN), 1951 (CBRN), 1971 (CBRN), 1999 (BRN), 1977, and 1992
- ASTM Standards - F 1868 Standard Test Method for Thermal and Evaporative Resistance of Clothing Materials Using a Sweating Hot Plate and Proposed Standard Practice for Determining the Physiological Responses of the Wearer to Protective Clothing Ensembles
- F2668-07 Standard Practice for Determining the Physiological Responses of Wearer to Protective Clothing Ensembles

Stakeholders

- Emergency Responders
- Manufacturers
- Test Laboratories

Key Partners

NFPA® ASTM INTERNATIONAL Standards Worldwide UL®

Project Scope

- 3-year project consisting of a series of experiments to be performed on a thermal manikin and human subjects wearing different type of emergency response protective ensembles (data on skin/core temp, CO2/O2, microclimate temp, etc.).
- Collected data will enable the development and validation of physiological performance models to correlate the effect of ensemble THL characteristics on emergency responder performance.

Milestones FY12

- Q1 Abstract on the thermal manikin testing accepted by the European Symposium on Protective clothing (collaboration with TNO)
- Q2 Start data collection
- Q3 50% phase 1 data collection; Presentation on the thermal manikin testing at the European Symposium on Protective clothing (collaboration with TNO)
- Q4 Send paper on thermal manikin testing (collaboration with TNO) to OD

Outputs

- Submission of manuscripts to peer-reviewed journals.
- Presentation of the physiological performance models and recommendations on establishment of THL criteria with a physiological basis for use to the NFPA Technical Committees(1994, 1971, 1977, 1951, 1992) and to the ASTM F23.
- Conference presentations

Outcomes

- Revisions or updates to all applicable NFPA Standards and ASTM Test Methods.
- Outputs cited by other researchers working on heat stress or firefighter PPE.

Updated: 8 March 2012