Physiological Validation of the Total Heat Loss (THL) Test FY17 (921ZBFR)

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

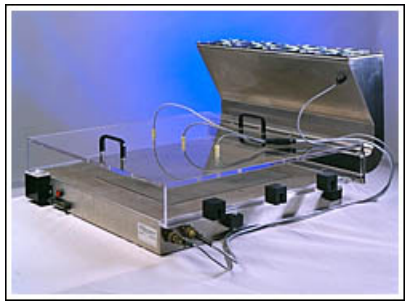

Fig. 1 Total Heat Loss Apparatus

Fig. 2 Thermal Manikin

Fig. 3 Human Subjects

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

- The 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 FY17

- Q1 Data analysis 5 year review presentation.
- Q2 Data collection (international collaboration), abstracts from THL data to ACSM, and manuscripts preparation.
- Q3 Work on South Korea International Collaboration (data, report and manuscripts). Presentation at the ACSM 2017
- Q4 Continue writing the papers.

Updated: 27 March 2017

Outputs

- Conference presentations (14 presentations to date: ECPC,ICEE, FIERO, ACSM, TSWG, 1 accepted presentations ACSM)
- Manuscripts to peer-reviewed journals (5 papers published to date, 4 in preparation)
- Presentation of the 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.

Outcomes

- Project outputs are used to revise/update applicable NFPA Standards and ASTM Test Methods.
- Outputs cited by other researchers working on heat stress or firefighter PPE.