

Physiological Validation of the Total Heat Loss (THL) Test FY15 (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

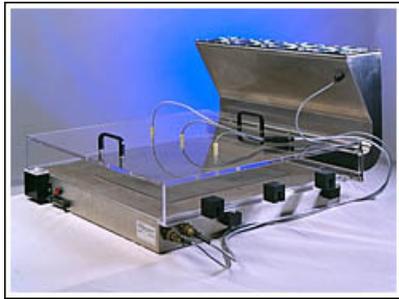


Fig. 1 Total Heat Loss Apparatus



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



Project Scope

- 4-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 FY15

- Q1 Finish Contract with South Florida University and start writing a paper from the data
- Q2 Abstracts from THL data to ACSM, and ICEE
- Q3 Presentations at the ICEE 2015 and ACSM 2015.
- Q4 Begin phase 3 data collection. Send paper on heat acclimatization to OD

Outputs

- Conference presentations (6 presentations to date: ECPC, ICEE, FIERO and ACSM, 3 accepted presentations ACSM)
- Manuscripts to peer-reviewed journals (4 papers published to date, 2 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.

Updated: 20 Feb 2015