

Phase Change Material Firefighter Vest

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Objective

Build a cooling system that would be integrated into existing fireman's gear. This cooling system should increase the firefighter's performance by prolonging the time he/she could work in a fire before becoming overheated. The device should not constrain movement or increase preparation time by any significant amount.



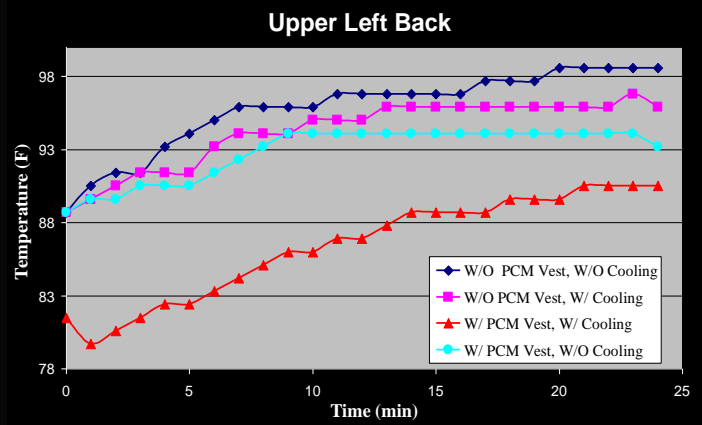
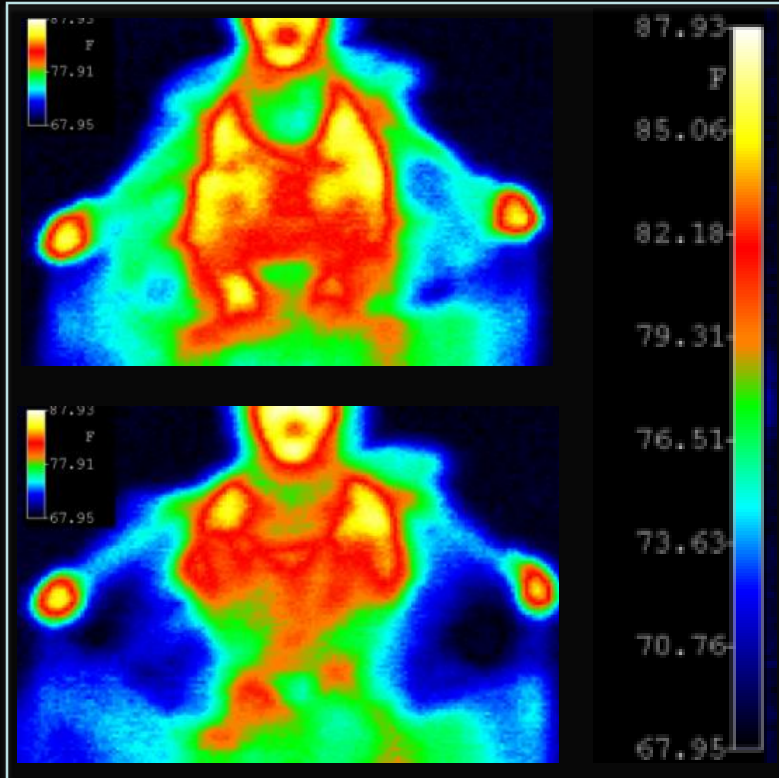
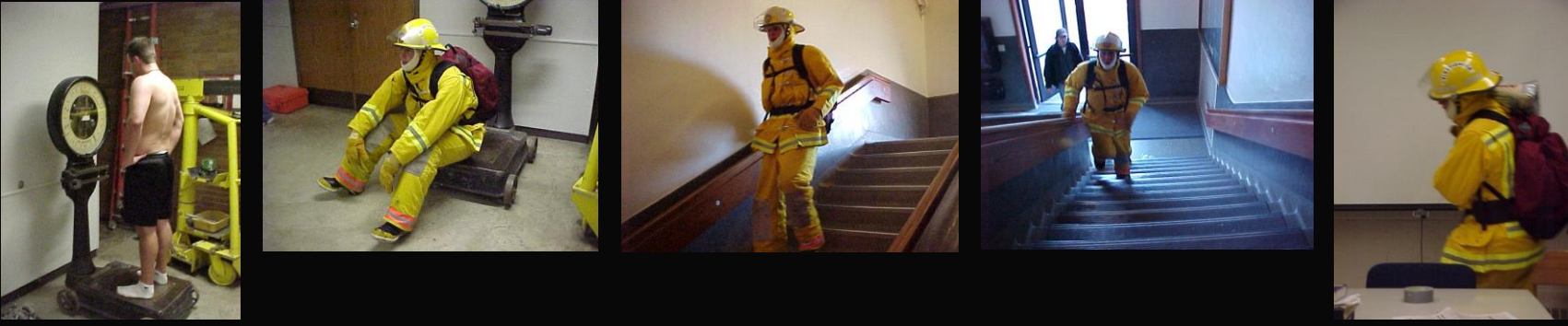
Temperature Measurements

- Wireless preprogrammed temperature sensors (*i*-Buttons) take measurements every minute
- 10 *i*-Buttons fitted into pockets sewn into T-shirt



- Vest patterned with pockets for PCM capsules
- Pipette stems are trimmed
- PCM is liquefied
- Pipette bulbs are filled with PCM
- Pipette bulbs then heat sealed and stems crimped

Test Procedure



After 23 minutes, skin temperature increase was:

- W/O PCM, W/O Cooling: 89-99° F, a 10° F (11.2%) increase
- W/O PCM, W/ Cooling: 89-97° F, a 8° F (8.9%) increase
- W/ PCM, W/ Cooling: 89-91° F, a 3° F (2.3%) increase
- W/ PCM, W/O Cooling: 89-94° F, a 5° F (5.5%) increase