

# Improved Chemical Heating

## PROBLEM / OBJECTIVE

Existing flameless ration heaters provide a method for heating the Meal, Ready-to-Eat (MRE) entrees for the Soldier in the field. Heating mechanisms of the flameless ration heater use water to activate an electrochemical pad. An alternate waterless heating technology using zinc-air was developed, but an affordable manufacturing process did not exist and heaters were too expensive to use within the MRE and other ration platforms.

The objective of this collaborative Army ManTech-Army SBIR (Small Business Innovation Research) project was to advance the manufacturing readiness level (MRL), bring the cost down, and meet weight, performance and safety metrics.

## ACCOMPLISHMENTS / PAYOFF

**Process Improvement:** Air activated flameless heating was demonstrated using encapsulated pyrophoric aluminum to produce safe, controlled heating. ManTech funding resulted in:

- Improved processing throughput that reduced wasted materials during manufacturing, leading to a 20% decrease in raw materials required.
- Improved packaging techniques that eliminated a full layer of packaging.

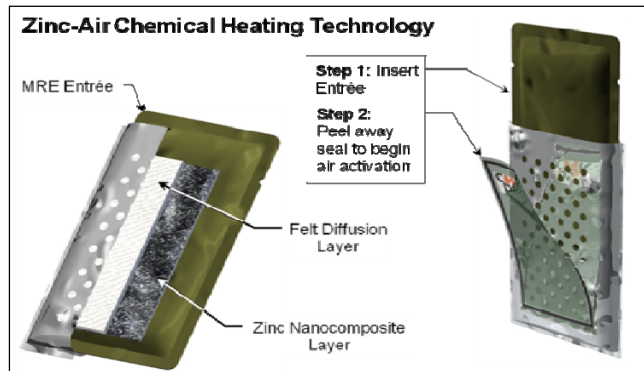
Heating performance improvement, resulting in less materials needed to meet heating specification.

- Demonstration of an MRL 8 pilot line consists of several machines and stations with a production rate of 100 units per minute. (25,000 units per week).

### **Implementation and Technology Transfer:**

As a result of this ManTech project, over 18,000 prototype units were produced and packaged within MREs for testing.

Technology Transition occurred with the DoD Combat Feeding Program which is funding the DT&E and the Defense Logistics Agency – Troop Support for use within the MRE. Industry partners expressed interest for use in consumer products (camping, etc.) with a potential market of 40 million units per year. Medical applications are being explored including quick-set casts for medical community.



### **Expected Benefits and Warfighter Impact:**

Benefits of the improved chemical heater include:

- Enhanced user operational safety
- Enhanced ease of use for “heat on the go”
- No loss or degradation of operational capability
- Similar platform to the current Mg-Fe heater
- Increased industrial capacity for surge requirements
- Documented Cost Savings of \$3M with Return on Investment (ROI) of 3.5:1 for low rate prototype production.

## TIME LINE / MILESTONE

Start Date	January 2010
End Date	February 2013

## FUNDING

U.S. Army ManTech	\$1.1M
Army SBIR (Phase II Enhancement)	\$0.73M

## PARTICIPANTS

U.S. Army RDECOM Natick Soldier Research, Development and Engineering Center, Natick, MA  
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