



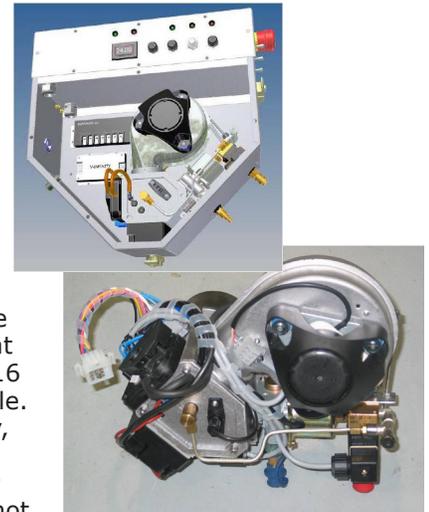
SELF-POWERED TRAY RATION HEATER (SPTRH) SYSTEM - ARMY

PURPOSE:

The SPTRH is a thermo-electric based self-powered improvement to the standard Tray Ration Heater (TRH). Operating electricity from the heat of combustion is produced by the thermoelectric modules of the SPTRH and used to power system operation. This ultimately eliminates the need for HMMWV or generator support for system operation. The SPTRH is targeted as a technology insertion into the Army Assault Kitchen (AK), the USMC Tray Ration Heating System (TRHS), and the AF Single Pallet Expeditionary Kitchen (SPEK).

CHARACTERISTICS:

The SPTRH is similar in construction and operation as the fielded TRH. It consists of a stainless steel water tank and a control panel, but has thermoelectric modules installed on the underside of the tank. When the system burner is operated, the burner off-gas heats the hot side of the modules, which transfers heat to the water in the ration heating tank. The water in the tank cools the cold side of the thermoelectric modules. The result is the production of electrical power required for operation of the system. An on-board battery is required to initiate SPTRH operation and provide power to the burner during the initial 9 min of operation. After 9 min, the thermoelectric modules provide enough power to operate the system. Safety features of the SPTRH include thermostatic control to ensure the water temperature stays below the boiling point, a low water sensor that shuts off the burner if the water depth in the tank falls below 4 inches (10.16 cm), and a tilt switch to shut the burner off at an excessive operational angle. The self-powered capability of the SPTRH improves overall system reliability, availability, and maintainability (RAM) characteristics because solid-state thermoelectrics require less maintenance than a generator or vehicle power supply. It also ensures the availability of a kitchen to produce hot meals is not eliminated if the vehicle must be taken away for a higher priority mission or if the generator fails.



CAPABILITY & BENEFITS:

- Eliminates requirement for generator or vehicle power supply for heater tank operation.
- Reduces fuel consumption by 50% because neither a generator nor vehicle is needed to provide power.
- Ultra-reliable, with thermoelectric generator solid-state architecture that improves system RAM characteristics.
- Enables kitchen to be delivered to feeding site so HMMWV can be used for other missions.
- Offers similar performance characteristics as the TRH, including capacity, heating time, size, weight, and cube.
- Utilizes a standard commercial DC powered burner.



COMMENTS:

A User Evaluation of the SPTRH integrated into the Army AK is planned for FY10. The SPTRH may be inserted into the AK program as early as FY11 as an Engineering Change Proposal.

POINT OF CONTACT:

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AT A GLANCE:

- **CAPACITY:**
18 tray packs
- **WEIGHT:**
Less than 400 lbs (180 kg)
- **UTILITIES/POWER:**
JP-8; uses a commercial DC powered 40 Watt burner
- **COMPATIBILITY:**
Compatible with Army AK, USMC TRHS, and AF SPEK

UNCLASSIFIED

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