

BENEFITS:

- Rapid Heat Absorption over 10 to 100 seconds
- Controlled Heat Rejection over 5 to 30 Minutes
- 5 to 10 times reduction in system power consumption
- Small, highly scalable heat exchanger

APPLICATIONS:

- High Power Lasers
- Power Electronics Systems
- High Power Radar and Microwave Systems

SPECIFICATIONS:

- **Energy Storage:** 2.0 MJ
- **Heat Loads:** 10 to 25 kW
- **TES Melt Temp:** 5°C
- **High Eff. Conductivity:**
 $k_{eff} > 100W/m \cdot K$
- **Refreeze Time:** 15 Minutes
- **Heat Acquisition Fluids:**
R-134a, Ammonia or Water
- **Weight:** 23.8 kg* (52.7 lb)
- **Volume:** 18 Liters*

*excludes housing & manifolds

Thermal Energy Storage (TES) Technology

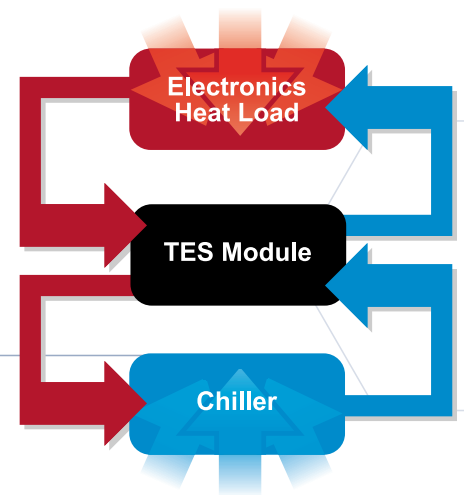
Next generation military weapons systems, such as tactical lasers, and all-electric vehicles are being developed to enhance and extend the warfighting capabilities of the U.S. military. Unfortunately these technologies require tremendous power consumption, generate large heat loads in relatively short time periods (less than 100 seconds), and have challenging cooling requirements. To make matters worse, the intended tactical platforms such as gunships, tanks, and fighter jets, suffer from cooling, space, and limited heat rejection constraints. Conventional cooling systems cannot support the size, weight, and power (SWaP) required by these weapon systems. RINI Technologies' patented TES Solution provides a significant advantage by storing heat rapidly during weapon use and then slowly rejecting the heat during inactive periods which typically last 5 to 30 minutes. The result is that TES delivers dramatic SWaP reductions, enabling the deployment of these power hungry weapons systems on compact tactical platforms.



How TES Works:

RINI Technologies' TES module functions as a condenser or a heat exchanger in the heat-acquisition loop. It stores the heat as it is generated in real time. By employing a phase change material (PCM) embedded in a high-conductivity porous graphite matrix, heat is stored, while maintaining a nearly constant device temperature. The stored heat can then be slowly rejected during periods of inactivity. The unique design of RINI's TES facilitates simplified integration with the heat-acquisition subsystems such as RINI's Laser

Evaporative Spray Cooling (ESC), while greatly improving the SWaP of heat rejection subsystems. TES technology is scalable and can be adapted to any heat load requirement.



About RINI Technologies:

RINI Technologies provides innovative solutions to the toughest thermal-management challenges. The company specializes in advanced Evaporative Spray Cooling (ESC), Thermal Energy Storage (TES) solutions and miniature refrigeration systems. Applications include high-power lasers, power electronics, and personal cooling. Contact RINI Technologies today to discuss how its engineers can address your cooling concerns with a complete system solution.