



Industrial Consultancy & Sponsored Research (IC&SR)

A Portable Thermal Energy Storage Device and Method Thereof IITM Technology Available for Licensing

PROBLEMSTATEMENT

- **Thermal energy storage** technology is crucial for energy sustainability and efficiency.
- It **captures and retains thermal energy** during surplus periods, enabling later use during high demand periods.
- **Applications include steam sterilization systems**, renewable energy integration, **district heating and cooling setups**, **solar power plants**, industrial processes, and residential climate control.
- **Current systems struggle with mobility**, thermal efficacy, and storage capacity.
- **Some struggle to balance energy storage and release**, leading to wasteful utilization and dissipation.
- **Previous solutions lacked flexibility** to cater to diverse scenarios and failed to mitigate heat loss.
- **There is a need for an advanced**, versatile thermal energy storage device that **delivers superior performance** across a wide range of applications.

TECHNOLOGYCATEGORY MARKET

Technology: Portable Thermal Energy Storage Device

Category: Energy, Energy Storage & Renewable Energy

Industry: Manufacturing/Chemical/Thermal Energy

Application: Thermal Energy Storage

Market: The global market size is projected to grow from **USD 267.39 Billion in 2024 to USD 957.07 billion by 2032**, exhibiting a compound annual growth rate (CAGR) of **15.20%** during the forecast period (2024 - 2032).

INTELLECTUAL PROPERTY

IITM IDF Ref. 2574, Patent No: IN 548327

TRL (Technology Readiness Level)

TRL-6, Technology validated in relevant environment (Industrially relevant enabling technologies)

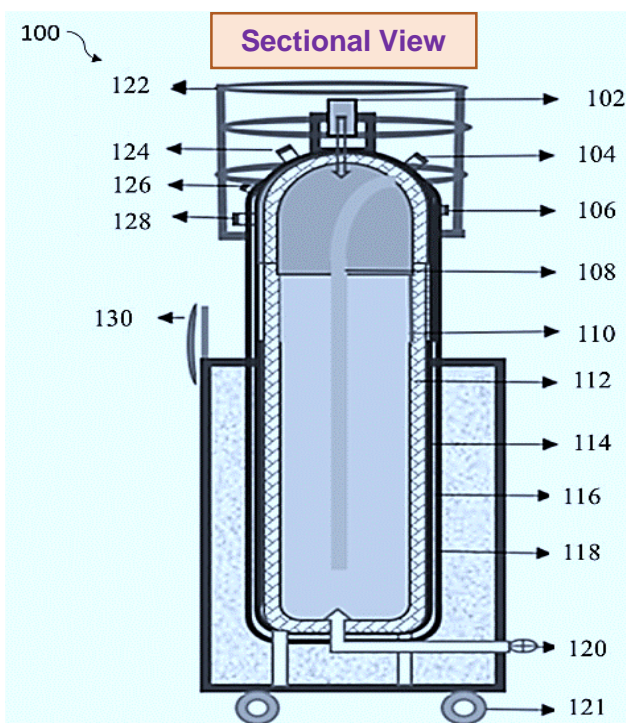
Research Lab

Prof. Sathyan Subbiah, Dept. of Mechanical Engineering

Prof. Ramachandra Rao M S, Dept of Physics

TECHNOLOGY

Portable Thermal Storage Device



| Numerals | Definition |
|----------|----------------------------------|
| 102,104 | Thermocouple , Exothermic Port |
| 106,108 | Vacuum port, Exothermic Capsule |
| 110,112 | Core cylinder , Glass Wool Layer |
| 114,116 | Vacuum layer, Ceramic wool layer |
| 118,120 | Metal cladding, Inlet port |
| 121,122 | Movable trolley, Safeguard |
| 124,126 | Safety valve, Pressure gauge |
| 128,130 | Outlet port, Handle |

CONTACT US

Dr. Dara Ajay, Head TTO
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
<https://ipm.icsr.in/ipm/>

Email: headtto-icsr@icsrpis.iitm.ac.in
tto-mktg@icsrpis.iitm.ac.in

Phone: +91-44-2257 9756/ 9719

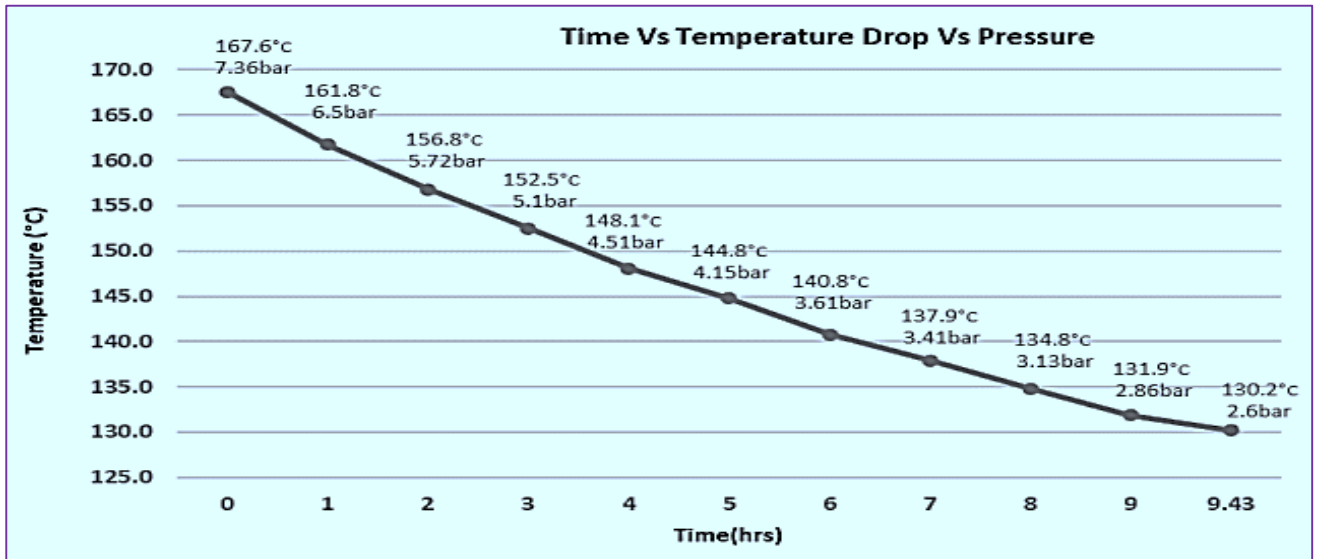


Method

Configuring a portable storage chamber to store thermal energy

Configuring maintaining a desired temperature of the portable storage chamber through an exothermic reaction, by an exothermic capsule, and is attached to the portable storage chamber through an exothermic port, wherein a predetermined quantity of water and at least one exothermic material are added into the exothermic capsule in case of a temperature reduction in the portable storage chamber

The below graph illustrates the temperature drop of the portable storage chamber with insulation



Key Features / Value Proposition

Exothermic material:

- Exothermic salt selected from Calcium chloride, Magnesium sulphate heptahydrate, Sodium acetate, and Ammonium nitrate.

Portable storage chamber:

- Inlet port for thermal energy, outlet port for thermal energy release, and vacuum port for air removal.

Fail-safe unit:

- Includes redundant pressure relief valves and a shutdown switch.

Movable trolley arrangement:

- Facilitates movement of the portable chamber for operational usage.

Exothermic capsule configuration:

- Constructed with a sealed and open end tube for easy insertion and removal of exothermic material and water.

Temperature measurement:

- Measured by a thermocouple connected to the chamber.

CONTACT US

Dr. Dara Ajay, Head TTO
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
<https://ipm.icsr.in/ipm/>

Email: headtto-icsr@icsrpis.iitm.ac.in
tto-mktg@icsrpis.iitm.ac.in

Phone: +91-44-2257 9756/ 9719