Plate phase change energy storage heat exchanger

This paper investigated a novel pillow plate type heat exchanger based on latent heat thermal energy storage, while the phase change material - sodium acetate trihydrate was ...

DOI: 10.1016/J.ENCONMAN.2018.12.013 Corpus ID: 104300527; Plate type heat exchanger for thermal energy storage and load shifting using phase change material @article{Saeed2019PlateTH, title={Plate type heat exchanger for thermal energy storage and load shifting using phase change material}, author={Rami M. Saeed and Joshua Paul Schlegel ...

Applying a well-performing heat exchanger is an efficient way to fortify the relatively low thermal response of phase-change materials (PCMs), which have broad application prospects in the fields of thermal management and energy storage. In this study, an improved PCM melting and solidification in corrugated (zigzag) plate heat exchanger are numerically ...

The performance of thermal energy storage based on phase change materials decreases as the location of the melt front moves away from the heat source. Fu et al. implement pressure-enhanced close ...

The paper presents an experimental investigation of a novel latent heat thermal energy storage system. The new energy storage unit is a pillow plate type heat exchanger with multi flowing channels, while the phase change material (PCM) - sodium acetate trihydrate (SAT) works as the energy storage medium.

This paper proposes a novel latent heat storage heat exchanger integrated heat supply and storage to address the intensity mismatch of renewable energy. Using experimental data in published literature validates the developed two-dimensional mathematical model. The thermal performance of the new device using paraffin RT50 as PCM is studied and analyzed in ...

For analyzing the effect of PCM type on the stored energy, the effect of using the four PCMs RT-35, RT-44, RT-50 and, P-116 with different phase change temperature, latent heat, heat capacity and Bi number was investigated by modeling a 44 mm outer diameter heat exchanger at 80 ? C HTF temperature. The obtained results showed that, P-116 had ...

The second part of the latent heat thermal energy storage is a heat exchanger that allows heat transfer between a heat transfer fluid and a phase change material. Thus, the ...

Thermal storage technology has received increasing attention under the policy of encouraging the development of renewable energy and new clean energy. Optimizing the heat exchange system of phase change thermal storage heat exchangers to obtain better performance has become increasingly urgent. This

study comprehensively investigated the actual process ...

Enhancing the heat transfer rate between PCM and HTF by increasing the heat transfer surface between these two fluids in the TESs is a practical solution to defer the T e change during charging or discharging processes. To achieve this, plate-type thermal energy storage systems (PTESs) have been presented as they can provide a massive heat transfer ...

The fight against climate change requires buildings to respond to energy efficiency and sustainability requirements, e.g., through the exploitation of renewable sources and the optimization of energy storage systems.Nowadays, a challenging issue of energy management concerns the matching between energy supply and demand, especially when ...

A plate heat exchanger thermal energy storage working with a heat pump was optimized. o The optimization observes significant enhancements in the system"s efficiency.

Phase change material Plate heat exchanger Numerical analysis ABSTRACT Plate-type thermal energy storage systems (PTESs) have been proposed to mitigate the effect of the low thermal ... efficient plate heat exchanger thermal energy storage system (PHETES), which is depicted in Fig. 1. Due to the low rate of Te changes, the PHETES has a greater ...

Abstract. Recently, there has been a renewed interest in solid-to-liquid phase-change materials (PCMs) for thermal energy storage (TES) solutions in response to ambitious decarbonization goals. While PCMs have very high thermal storage capacities, their typically low thermal conductivities impose limitations on energy charging and discharging rates. Extensive ...

Heat exchanger ABSTRACT The plate heat exchanger thermal energy storage system is recognized as a highly efcient form of latent heat thermal energy storage. However, existing studies show that the efciency and performance of these thermal energy storage systems are signicantly affected by the design variables, indicating the need of optimization

Tay N, Belusko M, Bruno F. An effectiveness-NTU technique for characterising tube- [28] Himran S, Suwono A, Mansoori GA. Characterization of alkanes and paraffin waxes in-tank phase change thermal energy storage systems. Appl Energy for application as phase change energy storage medium.

As the core of phase change energy storage technology, the heat transfer performance of phase change energy storage unit (PCESU) has an important impact on the operating efficien - cy of energy storage system. Plate-type phase change energy storage units (P-PCESU) and shell and tube PCESU are the most commonly used forms of PCESU [10, 11].

In this paper, a prototype of a plate-type phase-change heat exchanger (PPCHE) is designed, and the influence

of geometric parameters on the performance of the PPCHE is studied. Five ...

Today"s heat storage technologies mainly include sensible heat energy storage, latent heat energy storage (phase change energy storage), and thermochemical energy storage. ... in which the fins absorb heat from the front plate, transfer it to the PCM, and then the heat is transferred to the rear plate. They found that the branch-shaped fins ...

A wide range of applications can benefit from increased heat transfer performance and decreased installation area if the plate-and-frame heat exchanger can be modified to resemble a shell-and-tube heat exchanger without losing its inherent benefits in heat transfer improvement [116]. With welded plate technology, plate-and-frame design ...

Thermal Energy Storage with PCM Phase Change Materials (PCMs) store thermal energy during the phase change from solid to liquid, since the ... The PCM heat exchanger/cold plate design also plays a large role in ensuring a low-weight solution is built. PCMs, such as para?n wax, commonly used in these heat exchangers, have poor thermal ...

The new energy storage unit is a pillow plate type heat exchanger with multi flowing channels, while the phase change material (PCM) - sodium acetate trihydrate (SAT) works as the energy storage ...

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In the present work, the phase change energy storage heat exchanger in thermal control system of short-time and periodic working satellite payloads is taken as the research object. Under the condition of constant heated power of the satellite payload, the heat transfer characteristics of phase change energy storage heat exchanger are analyzed by numerical simulation and ...

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During energy storage, the heat transfer fluid (HTF) whose temperature was higher than the melting point of paraffin entered the heat exchanger. ... A numerical investigation of the melting heat transfer characteristics of phase change materials in different plate heat exchanger (latent heat thermal energy storage) systems. Int. J. Heat Mass ...

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