

The role of air energy storage hot tank

Can temperature regulation improve the performance of air storage tanks?

In this study, a temperature regulation method for air storage tanks is proposed with the aim of enhancing the performance of the A-CAES system. In this section, a comprehensive thermodynamic analysis is carried out, which encompasses the energy and the parametric analyses.

How do air storage tanks work in a-CAES?

To enhance the utilization of air storage tanks in the A-CAES, the waste heat generated in discharging phase is used to regulate the air temperature inside the storage tanks. This waste heat is reclaimed by water, which is subsequently injected into the air storage tanks to raise the temperature as needed.

What is a thermal oil storage tank?

Thermal oil is adopted to be the thermal energy storage medium. Two control volumes are conducted for the thermal oil storage tank, similar to those depicted for the air storage tank in Fig. 4. However, in the thermal oil storage tank, the heat exchange between the gas and the walls, as well as between the gas and the thermal oil, is ignored.

How does compressed air energy storage work?

The operation principle behind compressed air energy storage is simple. When there is excess electricity in a system, a fluid is compressed in a large impermeable cavity. The fluid remains in the cavity at high pressure until there is a need for power.

How AA-CAES system is integrated with a high-temperature thermal energy storage system?

The schematic diagram of the proposed AA-CAES system integrated with a high-temperature thermal energy storage system and an ORC: (a) charging and (b) discharging. As illustrated in Fig. 1 a, during the energy storage process, air enters CP1-CP4 and IC1-IC4. Then, the generated high-pressure air is stored in the ASC.

Does a heat exchanger affect the temperature of air storage tanks?

Therefore, as demonstrated in Fig. 15, it exhibits the same pattern as the air temperature in the air storage tanks. However, the heat exchanger has the capability to mitigate the impact of inlet temperature fluctuations on outlet temperature.

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