

A-Core Container

Solar spherical on-site energy storage system



Overview

Are solar thermal storage tanks spherical?

In this study, the collector and tank are made spherical, fixed, symmetrical and capable of tracking the sun regardless of the placement angle. Also, in an innovative idea, the solar thermal storage tank is designed as a double-walled spherical tank.

How do solar thermal storage systems work?

The water is heated in the collector and then stored in a tank whose surface is insulated. The shape of the collector and tank is an important factor in the development of solar thermal storage systems. In this study, the collector and tank are made spherical, fixed, symmetrical and capable of tracking the sun regardless of the placement angle.

Why is spherical storage important?

According to Fraunhofer, StEnSea's spherical storage is particularly well-suited for stabilizing power grids by providing frequency regulation and operating reserves.

How does a spherical solar tank work?

The outer surface of the spherical tank is covered with the black paint so that this surface is used as an absorber surface to store solar energy in PCM. In fact, the tank acts as a collector and is separated from the surrounding environment by placing a transparent cover made of bent glass pieces on it.

What is the thermal efficiency of spherical solar thermal storage system?

The thermal efficiency of the present spherical solar thermal storage system is 74 %, while that is 58 %, 38.3 %, 41.7 %, and 33.8 % for the flat plate water heater , the vacuum tube including PCM , vacuum tube including nanocomposite materials (NCPCM) , and vacuum tube without using PCM , respectively.

How much energy is stored in a spherical tank?

The total energies stored in the spherical tank storage system, taking into account the energy stored in the water, PCM, and the metal wall of the tank are 44.2, 55.6, 53.5, 51, 46.7, 45.8 MJ at flow rates of 1.25, 1.5, 1.75, 2, 2.25, and 2.5 l per minute, respectively.

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