

What is a solar air collector (SAC)?

A solar air collector (SAC) is a main device of a solar-thermal air system, which can absorb solar radiation and transfer the absorbed thermal energy to the air. This paper presents a systematic review of three basic types of SAC, namely, the flat-plate SAC (FPSAC), the evacuated tube SAC (EVTSA), and the concentrated SAC.

Do solar air collectors have a bibliometric network?

A bibliometric network on solar air collector studies has been provided. The flat-plate, evacuated tube and concentrated type collectors have been reviewed. Advanced topology designs of solar air collector configuration have been analyzed. Different enhancement technologies used in solar air collectors are reported.

Can solar air collectors improve heat transfer technologies?

In particular, the enhanced heat transfer technologies by using a highly efficient heat transfer component (heat pipe, etc.) have been reported. Based on the analysis of the existing solar air collectors studies, this study provides a perspective for researchers to further and better study SAC technologies. The main conclusions can be drawn as:

Can solar air collectors be used as a research parameter?

The yield of solar air collectors based on geographical and solar radiation conditions can be used as a further research parameter and application boundary conditions of SACs. At the same time, combining with local energy policies, elaborating its economic details or energy savings and providing emission reduction information are suggested.

Which concentrating solar collectors have the highest thermal efficiency?

Among the concentrated SACs, the linear concentrating solar collectors with an open Brayton cycle reached a highest outlet temperature of 350 °C corresponding to 75 % thermal efficiency. Optimization design of the concentrated SACs needs to be modified according to the certain applications and required temperature ranges.

How does a solar reflector work?

Except for the direct solar radiation, the receiver can also obtain almost all the solar radiation reflected by the reflector on it, thereby multiplying the total solar radiation received by the SAC and subsequently increasing the outlet air temperature.

The solar air collector, as a kind of solar heating device with air as a medium, has the advantages of simple structure, easy manufacture and maintenance, no freeze-proof, and ...

Experimental results indicate that, with an air mass flow rate of 0.03 kg/s, the dual-mode collector (named as

PT-RC collector) realized a daytime solar thermal efficiency of ...

Five critical parameters may have influence on the thermal performance of a solar air collector with one pass: (1) heat transfer resistance in the airflow channel, (2) height of the ...

This is necessary because a laminar sub-layer naturally forms over the absorber plate, ... Air passes through the collector only once. Double-pass solar air heaters: ... ranging ...

Transpired solar collectors (TSC) are one of the most popular solar thermal technologies for building fa&#231;ades. TSC use solar energy to heat the absorber surface, which ...

The collector was also applied to the solar greenhouse in Urumqi, and the results illustrate that: From November 2015 to February 2016, when the collector length is 16 m and ...

Experimental results indicate that, with an air mass flow rate of 0.03kg/s, the dual-mode collector (named as PT-RC collector) realized a daytime solar thermal efficiency of ...

The solar air collector includes vacuum double-glazing, PV module, absorber plate, air flow channel, PCM layer and thermal insulation layer arranged from top to bottom, as ...

This paper introduces a novel design for a solar PV/T air collector that utilizes staggered fins. The collector features double-layer flow channels in the same direction, with ...

The design of the collector was made to maximize the heat transfer and thermal energy utilization. Double pass solar air collectors allow for air to flow above and below the ...

This paper introduces a novel design for a solar PV/T air collector that utilizes staggered fins. The collector features double-layer flow channels in the same direction, with the upper channel ...

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