Solar trough collector tracking angle

How do parabolic trough collectors work?
Most parabolic trough collectors adopt north-south axis trackingand only track the solar azimuth angle rather than the solar elevation angle. Both the solar azimuth angle and the solar elevation angle determine the solar incidence angle,i.e.,the angle between the sun's rays and the normal vector to the aperture of the collector surface.

Why is the parabolic trough collector not used in winter?
For the northern hemisphere,the parabolic trough collector has a smaller solar elevation anglein winter,resulting in a larger solar incidence angle and serious cosine loss,and thus part of the solar incidence sunlight is not concentrated and not further utilized [13],[14],[15].

Does a parabolic trough concentrating collector receive direct solar radiation?
Therefore, for the purpose of optimizing the tracking mode of the parabolic trough concentrating collectors, the current work applied Hottel's clear-day radiation model with an aim to study the amount of direct solar radiation received by the parabolic mirror within a year under different tracking modes in Shanghai.

How to improve the annual solar-to-heat efficiency of parabolic trough collector technology?
For this reason, the annual solar-to-heat efficiency of parabolic trough collector technology can be improved. By adopting the rotatable axis tracking: The variation of the solar irradiance from 12:00 to 16:10 is plotted in Fig. 8 a, in the afternoon test.

How to reduce the cosine loss of the parabolic trough collector?
To reduce the cosine loss of the parabolic trough collector using the north-south tracking mode,Donald [16]proposed that,if the tilt angle of the solar collector could be adjusted monthly,the collector would maintain a higher solar elevation angle all throughout the year and thus obtain a higher annual performance.

What is the energy loss of the solar parabolic trough collector?
The energy loss of the solar parabolic trough collector mainly exists as optical loss,thermal loss and cosine loss. The optical loss is mainly caused by the materials of the mirror and glass envelope. The thermal loss occurs via radiation and convection due to the difference in temperature between the absorber tube and the ambient environment.

Effects of single-axis and dual-axis tracking modes, azimuth and elevating angle tracking errors on the optical performance were investigated and the thermal performance of ...

The PTC reflectors need to face the sun continuously hence the PTC collectors have Sun tracking mechanism. The Sun travels at a definite pace from east to west every day. The algorithm ...

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The parabolic trough concentrator)PTC(is a solar concentration technology that converts solar beam radiation into thermal energy in their linear focus receiver. This type of concentrator is commonly provided with one-axis solar tracking to ensure that the solar beam falls parallel to its axis. PTC applications divided into two main groups.

Highlights o Optical and thermal analysis for slope errors in parabolic trough collectors. o 70° rim angle has better performance over the wide range of aperture. o Optical ...

Parabolic trough solar collector (PTC) ... At the tracking angle of 0°, the high solar flux region symmetrically spans from 100° to 260°, and the maximum local flux spot also occurs symmetrically in the middle section (4-8 m), reaching a value of 72.41 kW/m 2. As the tracking angle increases, the high flux region expands and exhibits an ...

12. .a) Parabolic Trough Collector It is a principle of geometry that a parabolic reflector pointed at the sun will reflect parallel rays of light to the focal point of the ...

Parabolic Trough collector assembly is made with an automatic sun-tracking system, to get the solar angle of incidence between the beam of solar radiation and the normal on the surface of the ...

A parabolic trough solar collector with the concentration ratio of 24 was developed in the College of Engineering; Nanjing Agricultural University, China with the using of the TracePro software an ...

typical parabolic trough collector is described, and its material properties and operating conditions are identified. Sections 4.0 and 5.0 address the optimization of rim angle 0 and of geometrical concentration ratio C. The operating efficiency of the collector is calculated in Sec. 6.0. The sensi

Parabolic trough solar collector: A review on geometrical interpretation, mathematical model, and thermal performance augmentation, Singh, Raman Kumar, Chandra, Prakash ... By using certain parameters like selective materials, the optimum value of the rim angle, accurate tracking mechanism, etc, optical efficiency has been greatly improved, ...

The aperture angle in parabolic trough solar collectors (PTC) is the angle between the axis of the parabola and the line connecting the focus on one end of that parabola

Trough of the collector is oriented as east-west position with a small deviation of approximately 10°. To obtain the best performance parameters of the collector, the optimal ...

Single-axis Sun tracking tracks either one of the elevation angle or azimuth, which can be accomplished by ensuring the incident light falls on the plane formed by the primary optical axis and...

analyze the heat flux distribution on the absorber tube under some rim angle values. Keywords Parabolic

trough solar collector ·Monte Carlo ray tracing method · Heat flux distribution ·Finite Volume Method ·Rim angle 49.1 Introduction Solar thermal technology is based on a simple principle to generate electricity in a clean manner.

This paper presents analysis of rim angle effect on the geometric dimensions of Solar Parabolic-Trough Collector in Bauchi (SPTC). The focal length (f), the parabolic radius ...

The two-axis tracking can be applied to parabolic dish solar collectors (PDSCs), solar concentration towers, and also to the PTSC. Note that solar tracking allows the energy ...

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