Trough Solar Collector Light Analysis

What is optical analysis in parabolic trough solar collector?

The optical analysis is one of the most important parameters to investigate the performanceof the parabolic trough solar collector (PTSC). The output of the optical analysis is used as an input for the thermal analysis. The journey of the flux distribution studies started back in 1950 for the PTSC with a flat receiver.

What is a parabolic trough solar collector?

Fig. 2. Schematic of a parabolic trough solar collector. The cylindrical receiver consists of an absorber tube enclosed with the borosilicate glass cover, the gap between the absorber and glass cover is usually evacuated to minimize the convective heat loss from the absorber surface .

What is a parabolic trough collector graph?

These graphs enable the designer of parabolic trough collectors to calculate the performance and optimize the design with a simple hand calculator. The method is illustrated by spe cific examples that are typical of practical applications.

What is flux distribution study in parabolic trough solar collector?

The flux distribution study is one of the most important parameters to investigate the performance of the parabolic trough solar collector. The history of the flux distribution is started from 1957 at the focal plane with flat receiver till the 1980 s then followed by the cylindrical receiver.

Does parabolic trough solar collector have limb darkening effect?

Fig. 7. Potential optical errors in parabolic trough solar collector . A very few studies had considered the limb darkening effect in the incoming solar radiation. Negi et al. studied various correlation to provide the flux distribution on the flat receiver of PTSC, including the limb darkening effect.

Can MCRT tracing be used in parabolic trough solar collector?

Experimental setup of PARASCAN-II prototype . Monte Carlo ray tracing (MCRT) techniques have been used by numerous researchers to study the flux distribution on the receiver of parabolic trough solar collector. The use of MCRT for flux distribution has been started in the late 1970s, but mainly for the central tower receiver.

The results of a detailed optical analysis of parabolic trough solar collectors are summarized by a few universal graphs and curve fits. These graphs enable the designer of parabolic trough collectors to calculate the performance and optimize the design with a simple hand calculator. The method is illustrated by spe

Design and analysis of solar parabolic trough collector Priyesh Mhatre mhatrepriyesh2484@gmail Vivekanand Education Society"s Polytechnic, Mumbai, Maharashtra Chirag Thakur chiragrthakur11@gmail Vivekanand Education Society"s Polytechnic, Mumbai, Maharashtra ABSTRACT Solar energy is radiant light

and heat from the ...

In this study, optical performances of four solar trough concentrators, viz. the parabolic trough concentrator (PTC), the compound parabolic concentrator (CPC), the surface uniform...

This paper numerically investigates the performance of the EuroTrough-parabolic trough solar collector. The heat flux distribution on the absorber tube is evaluated by the Monte Carlo Ray Tracing (MCRT) method. To enhance the heat transfer, using a dimpled absorber tube instead of a plain absorber tube, and using nanofluid instead of Therminol® VP ...

The results of a detailed optical analysis of parabolic trough solar collectors are summarized by ...

6 NOMENCLATURE AND ABBREVIATIONS A a Aperture area of the collector (m2) A ri Inlet area of the receive tube (m2) A ro Outer area of the receive tube (m2) A

3 ???· Solar energy is prominent among these as it is abundant and reliable. This study ...

Numerical results show that the proposed sawtooth-shaped planar lightguide ...

A ray-tracing method was employed to establish a concentration model for ...

A new multiple chamber trough solar collector and its working principles are introduced. A 3D computer model supported with optical analysis software is used to analyze the ray tracing of the solar light concentrating system. This investigates the flat receiver and cylindrical receiver respectively as well as determining the ...

Comparative and sensitive analysis for parabolic trough solar collectors with a detailed Monte Carlo raytracing optical model

Comparative and sensitive analysis for parabolic trough solar collectors with a ...

Numerical results show that the proposed sawtooth-shaped planar lightguide solar concentrator achieves 2300x geometrical concentration ratio without any guiding ray-leakages from the planarLightguide.

[3] Ganga A and Jacob T 2019 heat transfer enhancement analysis of solar parabolic trough collector tube with pin fins International Research Journal of Engineering and Technology 6 2072-7 [Online]. Available: Go to reference in article; Google Scholar

In this study, a solar parabolic trough is optically analyzed with four different ...

A ray-tracing method was employed to establish a concentration model for parabolic trough solar collectors

based on finite element simulation. The analysis focused on the effects of non-ideal optical factors on the distribution of energy flow and optical efficiency. The results indicate that various factors cause different degrees of light escape and impact both ...

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