Trough solar collector model

Can thermal models be used to analyze parabolic trough solar collectors?
The review of thermal modeling approaches presents the steady and transient heat transfer analyses of single and two-phase (with direct steam generation) flows. Also, the computational fluid dynamics models used to analyze the physics of parabolic trough solar collectors with a better insight are reviewed and presented.

What is parabolic trough solar collector (PTSC)?
Parabolic Trough Solar Collector (PTSC) is one of such concentrating collectorswhich concentrates the solar insolation on the focal axis of parabolic reflectors where receiver is located. The absorber receives the thermal energy of arriving solar irradiations and transmissions the same to the Heat Transfer Fluid (HTF).

Do parabolic trough solar collectors improve performance?
Finally, the studies conducted on the performance improvement of parabolic trough solar collectors are separately examined and presented, these include novel designs, passive heat transfer enhancement, and nanoparticle laden flows. 1. Introduction

Which turbulators are best for hydrothermal trough collectors?
The outcomes revealed that the ribbed absorber tubeand the concentric rod insert are the most optimum turbulators. In addition,the parabolic trough collector equipped with a combination of corrugated channel and obstacle has a much better hydrothermal performance than the collectors using each of these turbulators separately.

What is a parabolic trough collector?
For these reasons the parabolic trough collector is made up of a number of single receiver pipesconnected in series up to the total length that is usually between 25 m and 150 m The parabolic trough mirrors are supported by a metallic structure and fixed using four mounting pads that are glued on the back.

How does a solar trough receiver improve Nusselt number?
According to their obtained results,the trapezoidal porous insertsin the absorber tube of the solar trough receiver improved the Nusselt number up to 13.80% at a 6.41 kg/s mass flow rate with just 1.7 kPa penalty in pressure drop.

In the present work, a novel parabolic trough solar collector model has been developed and validated. The validation has been carried out through a comparison with ...

This study aims to present the state-of-the-art of parabolic trough solar collector technology with a focus on different thermal performance analysis methods and components used in the...

The paper puts forward an in-house mathematical model of a parabolic trough collector (PTC). The collector

is fitted with a sun-tracking system with two rotation axes to increase the energy gain. The solar collector ...

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This paper is a summary of the last ten years of work on the study of parabolic trough collectors (PTCs) and compound parabolic collectors (CPCs) coupled to photovoltaic and thermal solar receiver collectors (SCR-PVTs).

Parabolic Trough Solar Collector (PTSC) is one of such concentrating collectors which concentrates the solar insolation on the focal axis of parabolic reflectors where receiver is located. The absorber receives the thermal energy of arriving solar irradiations and transmissions the same to the Heat Transfer Fluid (HTF). The PTSCs can ...

The present review paper focuses on various aspects of parabolic trough solar collector, such as general description, geometrical interpretation, and mathematical models dealing with...

A good mathematical model of parabolic trough solar collector (PTSC) can assist in achieving a variety of research objectives for it such as parametric enhancements, energy analysis, and optimization. Thus, it becomes necessary to explore and present any possible improvements in its modeling; this study inspects the same. In the current study, ...

The paper puts forward an in-house mathematical model of a parabolic trough collector (PTC). The collector is fitted with a sun-tracking system with two rotation axes to increase the energy gain. The solar collector comprises evacuated tubes with a triple-wall design of the absorber and two U-tubes inside. It should be highlighted ...

In this article, the flux distribution of parabolic trough solar collector (PTSC) is performed by considering limb darkening effect in the incoming solar radiation. Inhouse model is developed using the MATLAB tool for the analysis. The effort is also made to reduce...

Among the Concentrated Solar Collector (CSC) technologies, Parabolic Trough Collector (PTC) is the most mature and commercialized CSC technology today. Currently, solar PTC technology is mainly used for electricity generation despite its huge potential for heating, especially in industrial process heat (IPH) applications. Though the technology is well ...

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 ...

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In recent decades, solar energy has emerged as the most promising renewable energy source and the best alternative to conventional energy due to its abundant availability, free, clean, no atmospheric hazards, eco-friendly, sustainable nature, and other factors. Because of its wide temperature range (up to 400 °C), the parabolic trough solar collector is the most ...

The present review paper focuses on various aspects of parabolic trough solar collector, such as general description, geometrical interpretation, and mathematical models dealing with geometrical parameters and various types of performance calculations, trough modeling using a computational fluid dynamics tool, solar simulator ...

In the present work, a novel parabolic trough solar collector model has been developed and validated. The validation has been carried out through a comparison with results of previous studies conducted in the worldwide most renowned laboratories, i.e., Sandia National Laboratory (SNL) and National Renewable Energy Laboratory (NERL). The ...

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