

# Influence of the Debit and the Orientation of a Solar Converter

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**Abstract:** The work presented in this paper is the numerical study of a thermal converter. The main objective of the work is to study the effect of certain parameters on a flat solar collector. We are particularly interested in determining the influence of water flow on the operating characteristics of the solar collector and the effect of the orientation of a surface on the energy received. We have realized a mathematical model simulating the thermal behavior of collectors, to solve the mathematical model using an iterative method of Gauss-Seidel. According to the results obtained on this device, we note that: The inclination between 30 and 37 ° gives the best performances. The outlet temperature is higher for low flow. The overall efficiency increases with the flow of water.

**Key words:** the solar power, debit, solar converter, performance of the converter

## 1. Introduction

The thermal solar is mainly the production of the hot water using a solar water heater, is one of the most promising applications of the renewable energy, several research has been conducted in this field.

[1] have carried out a numerical study on the determination of the optimum surfaces of solar water heating systems. The optimization criterion is laminimisation of the total cost of the installation, [2] have studied the theoretical and experimental performances of a flat solar collector. This is mainly to study the effect of the geometric shape of the fluid passages on the sensor efficiency in the case of a direct water-absorption plate contact. A mathematical model has been developed and validated by comparison with tests to determine the thermal performance of the sensor whose absorption plate on the basis of certain geometric parameters with the theoretical results. In another device studied by Melih Tan [3], solar energy recovered in a south-facing sensor is transferred to a north sensor. The advantage of this system is not to directly heat the interior space but rather to reduce heat loss to the outside, [4-7]. The works presented in this article correspond also to improve the energy performance of a solar collector different internal and external parameters influence on the operating characteristics of a solar collector.

In this work we present the effect of the orientation of a surface on the received energy and the influence of water flow on the operating characteristics of the collector.

## 2. Description

The studied collector is showed by the diagram in the figure 1 below. This collector allows the conversion of energy from the electromagnetic radiation emitted by the sun into heat energy.

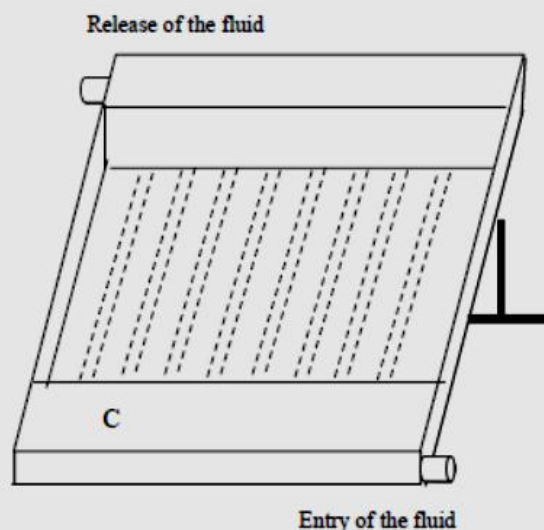


Fig. 1 Diagram of the system of a solar collector plan

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