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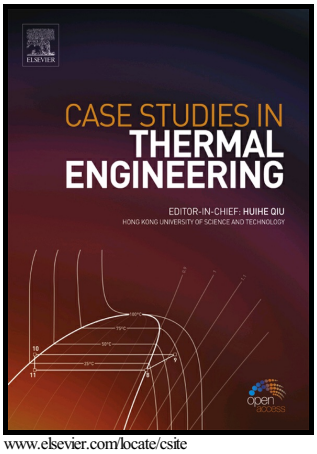

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Abstract
This paper describes performance solar water heating for flat plate collector. The system of thermal performance designed for dimensions 125 × 110 cm and width 25 cm, in such a way that fluid can flow from inlet to outlet through pipe with longer is 15.9 m, designed as lope square pattern, used the water as fluid flow working with two different flow rate (5.3 and 6.51 L/min). The experiments were carried out under the University of Technology, conditions of Baghdad, Iraq. The result shows that the water at flow rate 5.3 L/min heated more than the flow rate 6.51 L/min, which causes the higher efficiency and effectiveness of the collector, so the maximum temperature was (51.4 ^{o}C and 49 ^{o}C) at flow rate (5.3 L/min and 6.51 L/min) respectively. The main conclusion is that used this system to heated the water and then used in-house, building and other purposes.

Keywords: Flat plate collector, thermal performance, solar water heated

Nomenclature

A_{coll}	Collector area (m^2)
A_{pipe}	Pipe cross section area (m^2)
C_p	Specific heat capacity (kJ/kg K)
I_{Rad}	Intensity of solar radiation (W/m^2)
$\dot{m}$	Mass flow rate (kg/s)
T_{in}	Inlet fluid temperature (^{o}C)
T_f	Mean temperature (^{o}C)
T_{out}	Outlet temperature (^{o}C)
V	Velocity (m/sec)
Q_u	Useful energy gain (W)
Q	Volume flow rate (m^3/sec)
R_e	Reynolds number
η	Collector efficiency
Ɛ	Effectiveness

1 Introduction

Solar energy is a provider of clean and green energy, which can be used to fulfill global energy needs [1, 2]. The solar energy is very important which is coming from the sun as a form of the solar radiation, this can be an alternative energy source. The solar radiation can be useful for our