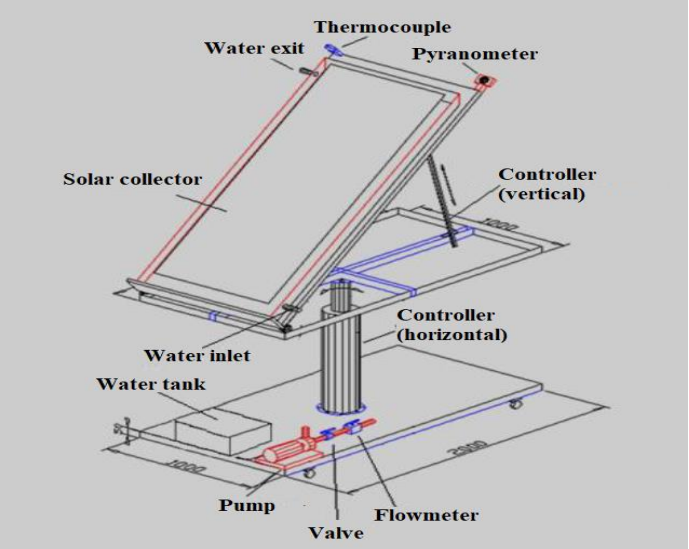
Improvement of the Performance of the Flat Plate Solar Collectors using Nanofluid

Adnan Sozen, PhD, Gazi University,TURKEY
Faruk Kilic, PhD, Gazi University,TURKEY
Erdem Ciftci, Gazi University,TURKEY
Tayfun Menlik, PhD, Gazi University,TURKEY
Cuma Kilinc, Gazi University,TURKEY

Abstract

Flat plate solar collectors (FPSCs) are widely used for heating applications. Thermal performance of the FPSCs are greatly affected by working fluid circulating inside the system. In this experimental study, it is aimed that thermal performance of a FPSC has been improved using nanofluid as the working fluid. Influences of different nanoparticles containing nanofluids on thermal performance have also been compared in this study. Nanofluids are the new generation working fluids utilized in heat transfer processes. They are the mixture of three main components: a base fluid, the nano particles of such materials as metal oxides and ceramics, and a surface-active agent (surfactant) material. Nanoparticles enhance the thermophysical properties of the base fluid, while a surfactant doped into the mixture prevents flocculation and sedimentations and extends the hanging time of the nanoparticles. A test rig has been set up according to ISO 9806 standard and experiments have been performed using nanofluid and deionized water, respectively. The findings, in addition, have been compared to each other. The maximum improvement in thermal performance of a FPSC has been obtained when nanofluid has been used as the working fluid inside the system.

Image



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1. Kasaiean A et al. (2018) Heat transfer network for a parabolic trough collector as a heat collecting element using nanofluid. Renewable Energy 123:439-449.
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3. Ozsoy A, Corumlu V (2018) Thermal performance of a thermosyphon heat pipe evacuated tube solar collector using silver-water nanofluid for commercial applications. Renewable Energy 122:26-34.
4. Kilic F, Menlik T, Sözen A (2018) Effect of titanium dioxide/water nanofluid use on thermal performance of the flat plate solar collector. Solar Energy 164-101-108.
5. Kaya H, Arslan K, Eltugral N (2018) Experimental investigation of thermal performance of an evacuated U-Tube solar collector with ZnO/Etylene glycol-pure water nanofluids. Renewable Energy 122:329-338.



Biography (150 word limit)

Adnan Sozen is a Professor of Energy Systems Engineering. He got his bachelor degree from SÜleyman Demiral University Mechanical Engineering Department. He completed his MSc. And PhD educations in Gazi University, Mechanical Engineering Department. He has lots of publication including nanofluids, renewable energy, heating-cooling systems and artificial neural network areas.

Email: asozen@gazi.edu.tr

Notes/Comments:

Presenting author details
Full name: Adnan Sozen
Contact number:+90 312 202 89 41
Mail id: asozen@gazi.edu.tr
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