

Higher Technical Institute
MECHANICAL ENGINEERING DEPARTMENT
DIPLOMA PROJECT
AN INVESTIGATION INTO THE PERFORMANCE
OF A THERMOSYPHON SOLAR WATER HEATER

By
TOMARIDES (JOHNY) IOANNIS
M/834

JUNE 1998

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HIGHER TECHNICAL INSTITUTE	PROJECT NO. 2920
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**An investigation into the Thermal Performance of a
Thermosyphon Solar Water Heater**

by

Ioannis (Johny) Tomaridis

**Project report
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Summary

An investigation into the Thermal Performance of a Thermosiphon Solar Water Heater
Objectives:

1. To study the ISO Standard on the Procedures for the performance characterization and yearly performance prediction of solar water heating systems.
2. To study the data acquisition system and the software available at the Test Center of the Applied Energy Center.
3. To carry out experimental tests and investigate the performance characteristics of a thermosiphon solar water heater, using the method described in ISO 9459-2
4. To analyze the test results and, if possible, compare them with simulation result

The first step that had to be taken in starting this project was to study the ISO standards in order to get an idea of the general structure of the program that had to be written which would take the readings required and according to ISO standards.

The next step that followed was to study the hardware available and adjust them for the needs of the test. After setting up the hardware small programs were written which tested the equipment used to perform the test (such as thermocouples, pump, solenoid valve). With those modules the whole program was constructed and run.

Readings were taken for individual days independent of each other recording the information required for the long-term prediction. The tests included a four-day test for sunny days, two-day tests for cloudy days, a draw off of water to determine the mixing curve that occurs in the storage cylinder as well as overnight heat losses for the storage tank and for the system as a whole.

These results however could not be used to make any statements about the performance of the system since they are in the form of system performance characteristics to be used to produce useful long-term results upon which conclusions can be made.

To make conclusions and understand the limitations and the advantages of the system however a person must know well every aspect of the design of the system. At the beginning of the project therefore more general information is given on the solar energy and the different designs of solar systems. Further on more specific information of the design of thermosiphon systems will be found which will help us justify the results of the obtained on the particular solar domestic hot water system.