



EXPERIMENTAL STUDY AND ANALYSIS OF FLAT PLATE SOLAR WATER HEATER WITH PUMP

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Abstract:

In this study, we are achieving the hot water from solar water heater. The solar water heater are archiving the solar radiation from sun energy after that we are obtaining the hot water, in this way we are obtained the various temperatures of hot water with the help of circulating pump, the pump are used for obtaining the various flow rate of using water. The solar water heater is having several parts such as collector, pipe, water container and pump.

Keywords: Solar Collector; Pipe; Water Containe; Pump.

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1. Introduction

the solar water heater are a system, which are used for the find out the hot water, in this way we are used the various component like this fixed pipe, flexible pipe, water circulating pump, solar collector, metallic water container and wood, solar collector making from the combination of wood and glass, the glass are mounted on the top position of collector and side portion are covered with the help of wood. The pump is used centrifugal type. The regulator is used for the purpose of achieving the various flow rate of hot water. The temperature is measured from digital measured devices.

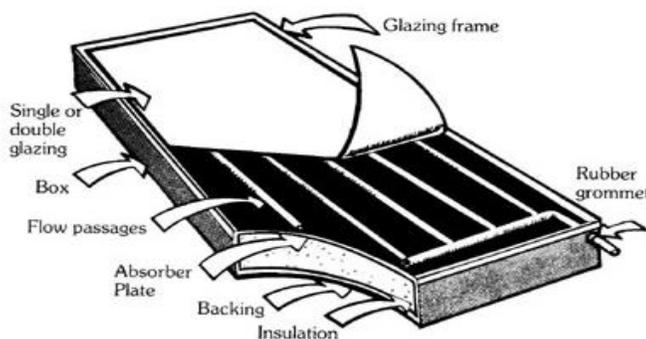


Figure1: Solar water heater

2. Results and Discussion

Table 1: Time and temperature with water flow rate 5 liters/ Minutes

Sr. No.	Time	Temperature in °C
1	10:00	24
2	11:00	25
3	12:00	35
4	13:00	38
5	14:00	36
6	15:00	34
7	16:00	30
8	17:00	26

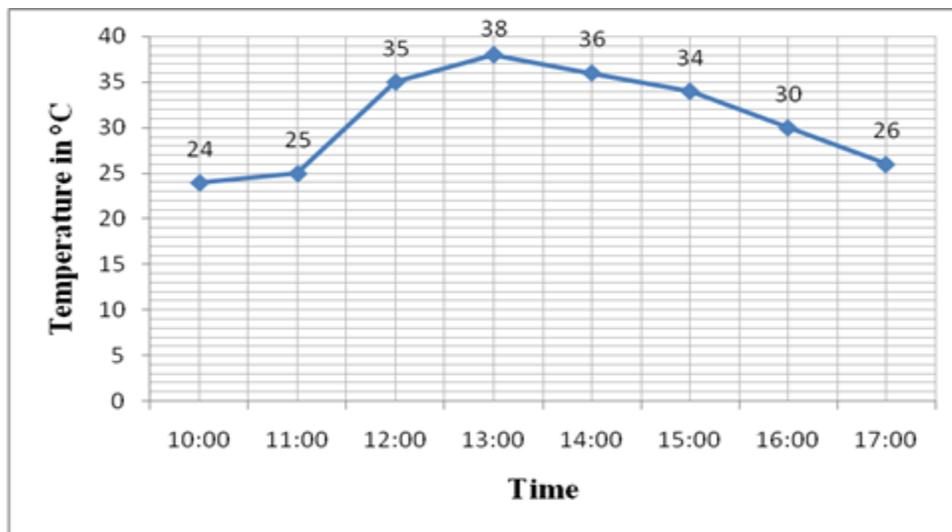


Figure 2: Time and temperature with water flow rate 5 liters/ Minutes

Table 2: Time and temperature with water flow rate 6 liters/ Minutes

Sr. No.	Time	Temperature in °C
1	10:00	28
2	11:00	30
3	12:00	32
4	13:00	40
5	14:00	38
6	15:00	36
7	16:00	33
8	17:00	30

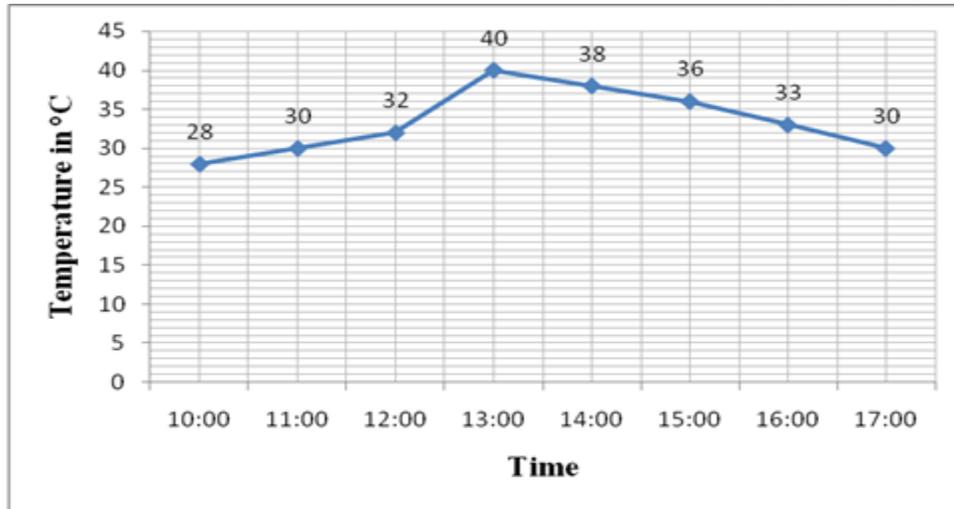


Figure 3: Time and temperature with water flow rate 6 liters/ Minutes

Table 3: Time and temperature with water flow rate 7 liters/ Minutes

Sr. No.	Time	Temperature in °C
1	10:00	29
2	11:00	32
3	12:00	36
4	13:00	43
5	14:00	41
6	15:00	38
7	16:00	35
8	17:00	32

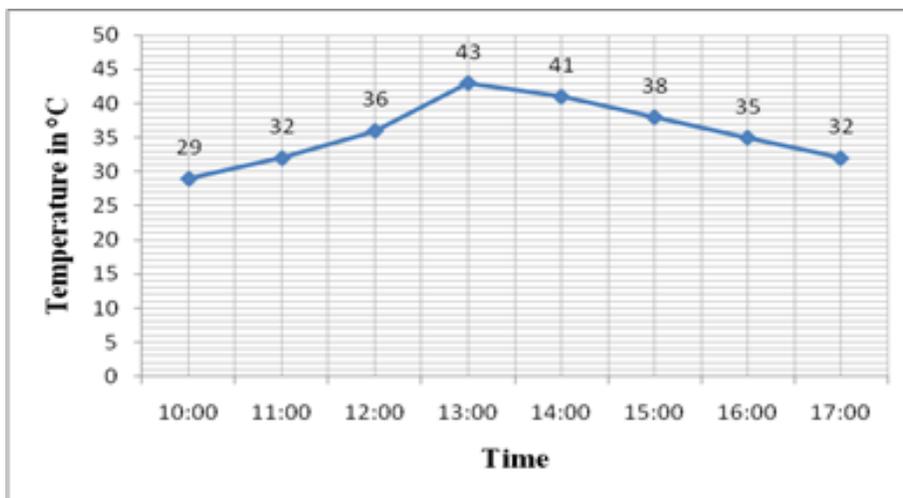


Figure 4: Time and temperature with water flow rate 7 liters/ Minutes

3. Conclusion

In this study, we are finding out the maximum temperature 43°C at the time 13:00 using of flow rate of water are 7 liters/ Minutes, which are shown in Table .3. The solar water heater is used in various applications. We are analyzed the temperature are increase by increasing the flow rate of water, the flow rate of water are controlled by regulator after this we are achieving the various flow rate of water.

References

- [1] Kaygusuz K, Comaklio Ayhan T., “Solar-assisted heat pump systems and energy storage”, *Solar Energy*, 47 (1), 1991, 383–391.
- [2] Chaturvedi SK, “Analysis of two-phase flow solar collectors with application to heat pumps”, *Journal of Solar Energy Engineering*, 104 (1), 1982, 358–365.
- [3] O’Dell MP, “Design method and performance of heat pumps with refrigerant- filled solar collectors”, *Journal of Solar Energy Engineering, Transaction of the ASME*, 106 (1), 1984, 159–164.
- [4] Bliss, R. W., “The derivations of several plate efficiency factor useful in the design of flat plate solar heat collectors”, *Solar Energy*, 3 (4), 1959, 55-64.
- [5] S. A. Klein, “Calculation of flat plate loss coefficients”, *Solar Energy* 17 (1), 1975, 79-80.