

DESIGN AND BUILD A WATER HEATING SYSTEM USING A HELICAL TYPE HEAT EXCHANGER BY UTILIZING THE EXHAUST HEAT OF THE AIR CONDITIONER CONDENSER

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1. Introduction

To take advantage of the heat energy wasted from the Air Conditioning (AC) system so that it is not wasted and does not cause global warming, a heat exchanger (water heater) is designed [1]. The form of wasted heat energy utilization is to add pipes from the compressor to the condenser. An Air Conditioner (AC) water heater tube installed in the AC system functions as a heat exchanger to absorb heat from the refrigerant pipe out to the compressor so that the water becomes hot and stored for later use.

2. Methodology

2.1. Equations

$$v = \pi r^2 \cdot t \quad (1)$$

$$Q = m_{water} \cdot C_{water} \cdot \Delta t \quad (2)$$

3. Results & Discussion

From the planning results obtained copper pipe heating material with a diameter of 0.00635 m, a pipe length of 8 m, and a total of 10 turns.

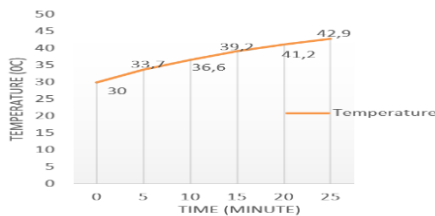


Figure 1. Graph of the Increase in Water Temperature from the use of heat from the AC Condenser

Table 2. Water Temperature Increase

No	Time (Minute)	Temperature (°C)	Current (Ampere)
1	0	30	4
2	5	33,7	4,2
3	10	36,6	4,4
4	15	39,2	4,6
5	20	41,2	4,2
6	25	42,9	4,3

4. Conclusion

From the trial results of the design of the heat exchanger (water heater), it was found that the water temperature increased by 42 liters by 50°C within 60 minutes and can be used for daily needs such as bathing, washing, and others.

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References

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