

# Design Water Heating

*by* Shandy Kurniadi

---

**Submission date:** 02-Oct-2022 03:49PM (UTC+0700)

**Submission ID:** 1914151865

**File name:** d\_Build\_a\_Water\_Heating\_System\_Using\_a\_Helical\_Type\_Heat...docx (40.19K)

**Word count:** 358

**Character count:** 1819

1  
**DESIGN AND BUILD A WATER HEATING SYSTEM USING A HELICAL TYPE HEAT EXCHANGER BY UTILIZING THE EXHAUST HEAT OF THE AIR CONDITIONER CONDENSER**

Shandy Kurniadi<sup>1</sup>, Trimon S Sinaga<sup>1</sup>, Dedikarni<sup>1</sup>, Eddy Elfiano<sup>1</sup>, Dody Yulianto<sup>1</sup>, Rafil Arizona<sup>1</sup>

3  
<sup>1</sup>Department of Mechanical Engineering, Universitas Islam Riau, Pekanbaru, INDONESIA.  
(E-mail: [Shandykurniadi0406@gmail.com](mailto:Shandykurniadi0406@gmail.com))

**Keywords:** Air conditioner, Water heating system, Helical type heat exchanger

**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**

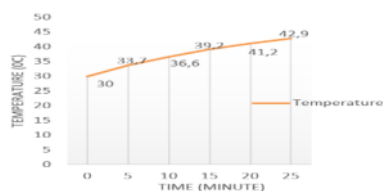
**2.1. Equations**

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

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

**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.

**Acknowledgments**

As a writer, I would like to express my deepest gratitude to the Mechanical Engineering Workshop, Faculty of Engineering, Universitas Islam Riau for allowing me to do this research, and IMIT SIC 2021 for allowing me to present my research at this event.

**References**

[1] Aziz, A., Ginting, H., Hatorangan, N., & Rahman, W. (2014). Analisis Kinerja Air Conditioning Sekaligus Sebagai Water Heater (ACWH). June 2014, 1–6. <https://doi.org/10.13140/RG.2.1.2396.5840/1>

# Design Water Heating

---

## ORIGINALITY REPORT

---

<b>12%</b>	<b>12%</b>	<b>2%</b>	<b>%</b>
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

---

## PRIMARY SOURCES

---

<b>1</b>	<b>repository.uir.ac.id</b> Internet Source	<b>6%</b>
<b>2</b>	<b>community.uthm.edu.my</b> Internet Source	<b>3%</b>
<b>3</b>	<b>dokumen.pub</b> Internet Source	<b>2%</b>

---

Exclude quotes  On

Exclude bibliography  On

Exclude matches  < 2%