

# Collecting Water from Atmospheric Moisture



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### Introduction

Dew is a result of condensed water vapor in cold surfaces like leaves and metals. What if dew was collected over large area? It could result in useful water, since this collection is difficult we have come up with the project that deals with water production from the atmosphere by changing atmospheric moisture into water droplets that are collected to form useful water. This process performed is by a machine called an exceptional water harvester. This machine uses simplified refrigeration system composed of small compressor, source of energy (battery) and condensation plates that work in unison to form water. All these are enclosed under a house-like structure resembling a Stevenson screen in meteorological station

Water is an essential commodity to all living things. Water makes around 70% of the earth. Although it is highest constituent of the earth it have been a great problem facing human. Due to this we have come up with the exceptional water harvester that will aid in converting the moisture in atmosphere to useful water. The machine will help people greatly since it can be used in small houses and large scale industries. It will solve the problem of water supply even in poor families and villages since government efforts haven't eliminated the problem in these levels.

Making this machine simple and needs few materials. The machine has two main parts, which are the water forming system and system housing

### Method

Materials for making water forming system are:

- |                      |                   |              |                |
|----------------------|-------------------|--------------|----------------|
| 1. aluminum sheets   | 2.copper wires    | 3.compressor | 4.cooling fins |
| 5. Coolant (R22 gas) | 6.charging valves | 7.motors     | 8.battery      |
| 9. Inverter          |                   |              |                |

Steps on making water forming system:

1. Join two aluminum sheets and pass the zigzag-bent copper tube through the sheets making sure they are in contact to maximize condensation in aluminum plates
3. Connect one end of copper tube to the cooling fins and another end in the compressor
4. Connect one end of cooper tube from the cooling fins and another to the compressor, from the compressor connect another tube to the condensation plates.
5. Using a recharging valve fill the coolant(R22 gas) in the compressor until it is full
6. Switch on the machine then collect the water dripping from it in any container.

Materials for making system housing:

- |          |        |                    |              |
|----------|--------|--------------------|--------------|
| 1. Nails | 2.wood | 3.aluminium sheets | 4.wire gauze |
|----------|--------|--------------------|--------------|

### Procedure

Steps on making system housing:

1. Join the woods using nails making the floor and divide it on the middle by wire gauze to make the two rooms
2. Make six pillars of about 30cm long and place them on the four angles of the floor and other two parallel to wire gauze
3. Using wood, nails and make a double ceilings leaving space between them and place aluminum sheets over the woods to make them slanted
4. Place the roof over the pillars and join them with nails to make a house like structure
5. Place the system in its housing. The compressor, cooling fins, inverter and battery in one room and condensation plates in another room
6. Cover the room with condensation plates using wire gauze.

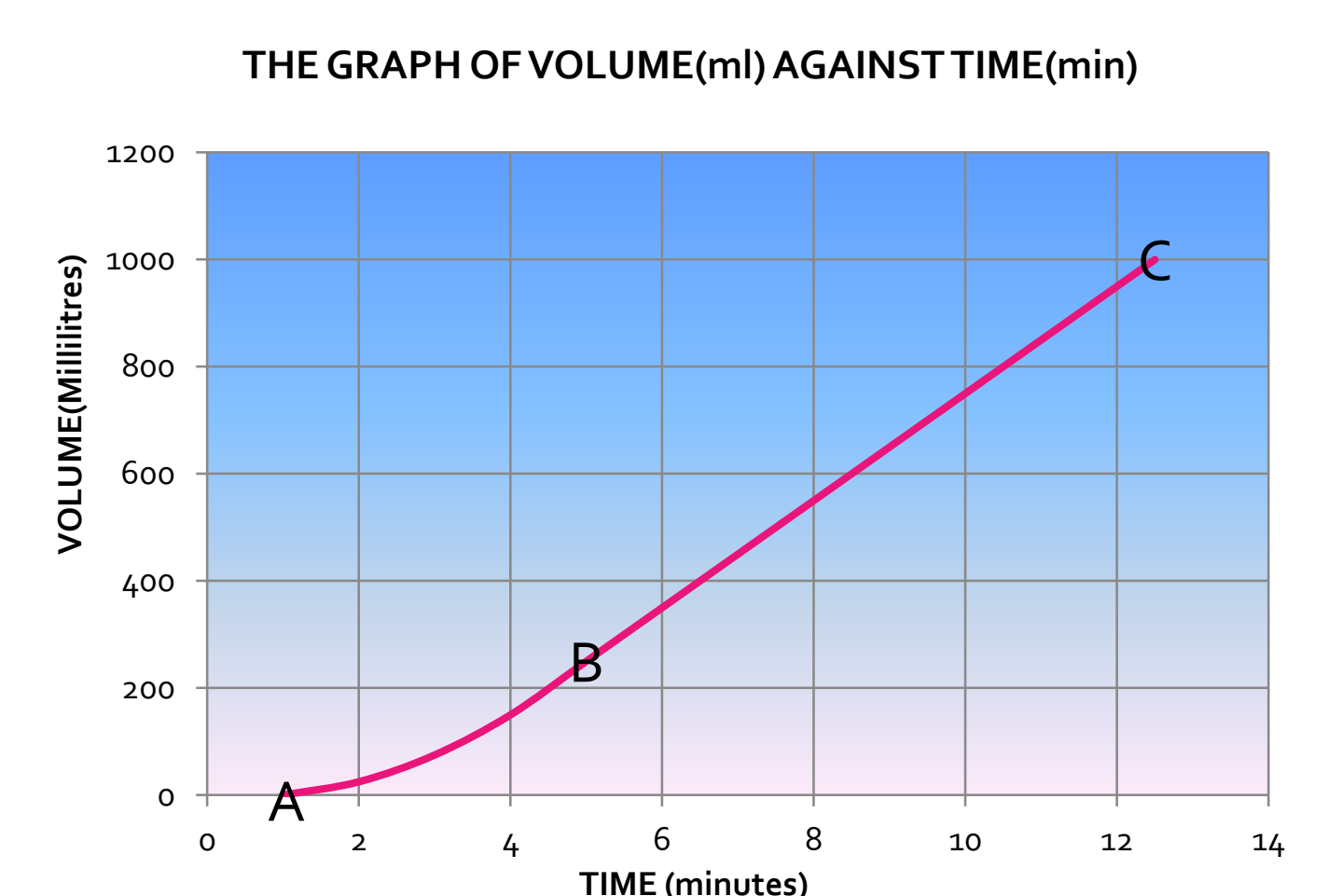
From there the machine is ready for use, for better results it should be placed in higher altitude so as to be free from dust and for effective condensation.

### Results

From the graph above there are two sections. Section AB and section BC which means:

☑Section AB: amount of water produced is small since when the machine is started it takes one minute to get wet without dripping water. In two minutes water produced is 25ml.after 4 minutes amount of water collected is about 150ml

☑Section BC: the amount of water produced is constant 100ml each minute. Therefore the maximum water production in this machine is 100ml per minute.



### Conclusions

From this data the machine can produce 100millilitre per minute therefore within 20 hours of the day, 120 liters of water can be collected since the machine doesn't stop working when started, it works continuously. Due to this it will be so helpful because the machine we have made is a sample with very small condensation plates but still it can accommodate uses of one person per day in all domestic activities. Once there is enough Fund, increasing the scale of machine could produce very large amount of water.

### References

- ☑Kenneth Wark,jr/Donald E. Richard(1999)thermodynamics.mc grow hill
- ☑Robinson (1935) applied thermodynamics. SIR ISAAC AND SONS LTD London
- ☑V.A Kirillin(1981)engineering thermodynamics. Mir publishers Moscow
- ☑Don L. Cannon (1982) understanding electronic control of energy systems. Texas instruments incorporated
- ☑S.Semyonou M. Sc (1975) engineering thermodynamics and heat transfer. Mir publishers