Effect of producing natural water by dehumidification of atmospheric air using conventionally designed Atmospheric water generator (AWG) in a humidified area of Sultanate of Oman

MAJID SULAIYAM GHANEEM AL DUWAIKI, MOHAMMED KHAMIS SALIM AL-HASHEMI, S.JANAKIRAMAN
Department of Engineering, University of Technology and Applied Sciences, Ibra, SULTANATE OF OMAN

Abstract: - Harvesting of water from natural air is recent trend in the present research field. Day to day life the depletion of water level is tremendously stepping down due to climatic condition. Due to this reason the major industries are involving in their research to find the solution in various field by various adopting technologies. These technologies named their work as atmospheric water generator (AWG). In this many researchers focusing on different type AWG based on the effectiveness of the humidification of air and location of the specific places at which the AWG installation required. This project aim for design and fabrication of conventional AWG using various thermal equipments. Based on the humidification area the components identified as compressor. Condenser, expansion valve, evaporator, and compressor. The different components involved in the project are used to harvest the air effectively from the humid air based on the working effectiveness. The proposed system is used to extract the humid air by using the induced fans from the outlet. Also the condenser plays a vital role to reduce the temperature of the cooling source by removing heat from the forced fan. These two fans are involved mainly to remove and extract the air from inlet and outlet. Once the air dew point reduces the water is dropped from the evaporator and collected in the water tank. Since the air are polluted from the toxic substance so the ozone filtration system and treatment process are triggered by means of reverse osmosis system. The system is operated, and air is converted in to water by means of proposed system effectively.

Key-Words: - AWG, humid air, thermal equipment, condenser, evaporator , fans

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1 Introduction

Water is the most important source on earth and it is oxygen as necessary for life. People can survive days or weeks without food but only about four days without water so we cannot live without water .And of course as the population grows demand for water increases. An adult consumes more than one liter a day. According to the World Health Organization in 2005, it affects about 2.8 billion people around the world and More than 12 billion people lack access to clean water or clean water to drink. In India, more than 50 percent of the population lacks access to safe drinking water.

Some resources are being used to provide water shortages such as groundwater and seawater desalination .Water transport is a problem and expensive, as well as desalination, usually near the sea. Air-to-water technology is the solution. And when we talk about our country, there are many places where water is scarce. And it has difficulty in extracting or delivering water to it.In our project, water production is based on air.

2 Problem Formulation

The present study of Oman and all over world shows the utilisation of water is main essential for domestic and industrial purposes. Based on the available sources various countries using their own research idea to harvest water from different sources. But there is study shows that plenty of water available in air through humidification areas. By identifying the several locations based on the humid air the key research initiated to develop the design and fabrication of AWG using conventional system. This proposed system will work effectively to harvest the water from air.

2.1 Motivations

1. Adopting AWG technologies by using conventional systems
2. Identifying the thermal components that can be used as simple refrigeration systems
3. Presently in Oman much more refrigeration system and air conditioning system are used one of valid reasons to use this AWG as greater possibility.

2.1.1 Scope and Limitations

- Each industrial and domestic industries can use this production of AWG to meet the requirements of harvesting water from natural air
- Due to thermal exchange components its ease and reliability to produce and install the AWG in various areas.
- The identified limitations are that sometimes the relative humidity is lesser places cannot able to adopt this system due to their specific humidification.

3 Problem Solution

The main objective of the research is to design and fabricate the conventional AWG with simple thermal components.

- Identifying the thermal components such as refrigeration components.
- To find the humification level to extract the water from humid air by dehumidification.
- To install the AWG the clear location is suited to ensure that such that system can capable to harvest water from natural air

4 Conclusion

Based on the studies we understand the working principle of simple refrigeration system. Also, the concept of simple refrigeration system used in the conventional AWG. This AWG is effective when its used conventional components which is used to extract the water from the humified air. Depending on the climatic condition the relative humidity is estimated due to which the quantity of water collected from the evaporator is justified. The quality of the water is mainly dependent on the water treatment process such as cleaning and osmosis systems. This conventional system is better working in the humidified areas and where it is limited to the non-humidified areas. In future scope instead of conventional solar system is to be focused. Additionally, the quality of the water is monitored by the automatic water control system.

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