



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 3

Issue: 1

Month of publication: January 2015

DOI:

www.ijraset.com

Call: ☎ 08813907089

E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Evaporative Air-Cooler Using Sponge Pads

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Abstract—Now days the technology development makes everything compatible and more reliable to satisfy human needs. Till the recent times by the use of some particular available materials only satisfied the human needs. But now there is a very big scope for the alternatives in order to replace or improve the existence. The world is constantly trying to find out a new technology, as our concern also the same.

Sponge pads: It is the material used to replace the conventional Evaporative pads, which is at presently used commonly in Air-coolers. Thus by replacing with a sponge pad makes the cooler more efficient in performance than by the conventional.

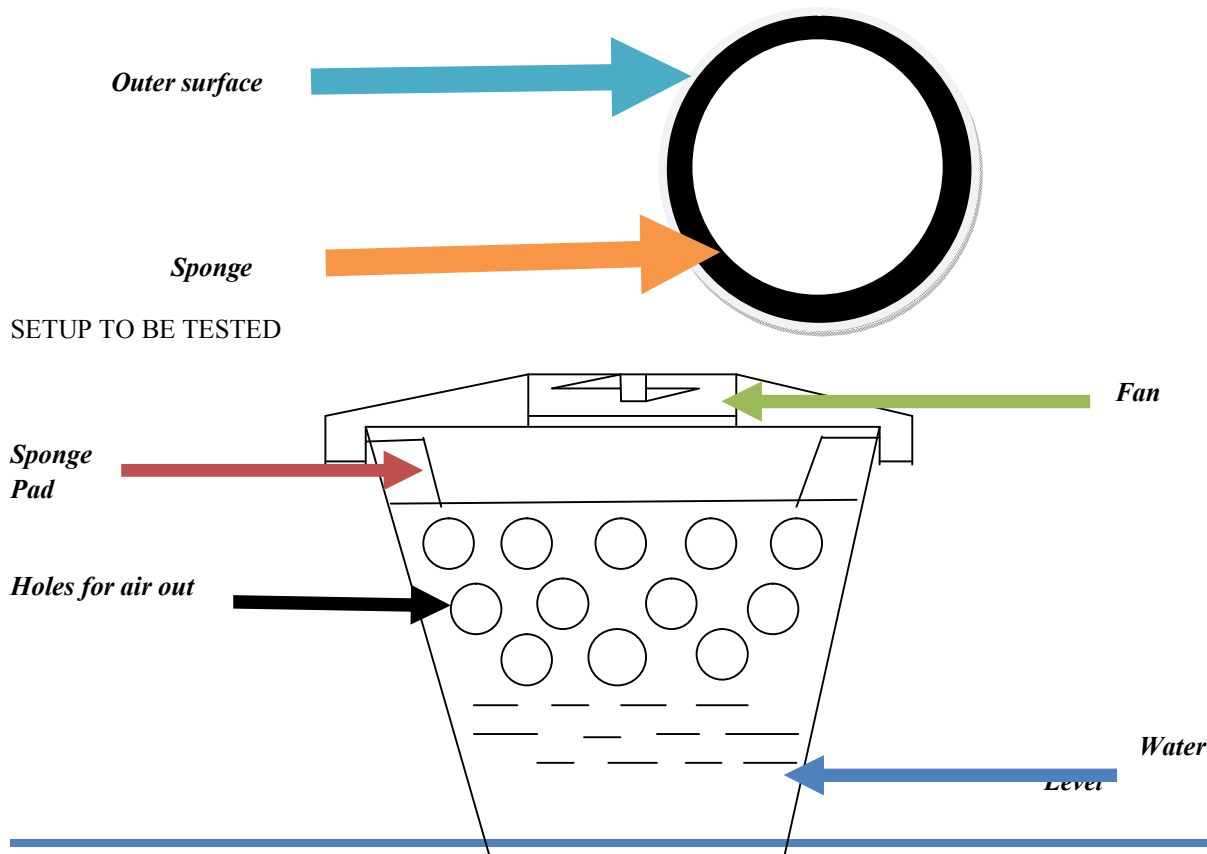
I. INTRODUCTION

Evaporative air cooler is a device that cools air through the Evaporation process. The evaporation is the main principal behind this system which briefs that air is brought in close contact to the water to a temperature close to wet bulb temperature to obtain the cooled air by this device. Evaporative cooling is extremely efficient cooling at very low cost. As our concept is to replace the evaporative pads with the **SPONGE**s which is artificial fiber sponge- polyurethane sponge combined with scouring pad. This makes the evaporation process easy and improves the performance of the cooler. Experimented this concept practically and we found the system was working more efficiently and it requires less maintenance.

II. SPONGE PADS

The effective method of replacing evaporative pads with sponge pads in the Evaporative cooler makes improvement in cooling rate and maintains the temperature to be constant. Main purpose of sponge pad is to absorb the water and to stay on that temperature for a long time.

III. BLOCK DIAGRAM



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Bucket Evaporative Air Cooler

The above block diagrams shows sponge that is to be placed in our setup to be made for testing its performance.

IV. BUCKET EVAPORATIVE AIR COOLER

The Bucket Evaporative Air cooler is a device that works as an air cooler which is made to assets the performance of sponge pads.

In this setup we used the following parts

- A. Bucket
 - B. Fan
 - C. Cooling pad(Sponge pad)
 - D. Aquarium water pump
 - E. Copper tube
 - F. Water as per required.
- 1) *Bucket*: It is main part in which the holes were made in order to give out the air.
 - 2) *Fan*: It is to bring the surrounding air into the Bucket which is connected to rotate oppositely as an exhaust fan alike.
 - 3) *Cooling pad*: The cooling pads are nothing but the sponge pad which is to be replaced the usage of Evaporative pads in present systems. Main purpose of sponge pad is to absorb the water and to stay on that temperature for a long time.
 - 4) *Aquarium water pump*: This is to circulate the water to be poured inside the setup over the sponge. This makes the sponge to stay wet. By the connection of Copper tube to it makes the circulation of water evenly.

V. WORKING AND ANALYSIS

The sponge pad inside the bucket absorbs the water which is to be poured and stay cool for long time (approximately 6 hours). As the fan bring the surrounding air into the Bucket and gives it out through the holes on the Bucket. Aquarium pump pumps the water and there is a vinyl tube which is attached to the pump, whose sides are made to be a small hole. This continues process makes the Chilled air to come out.

Power consumption

For Fan=12v

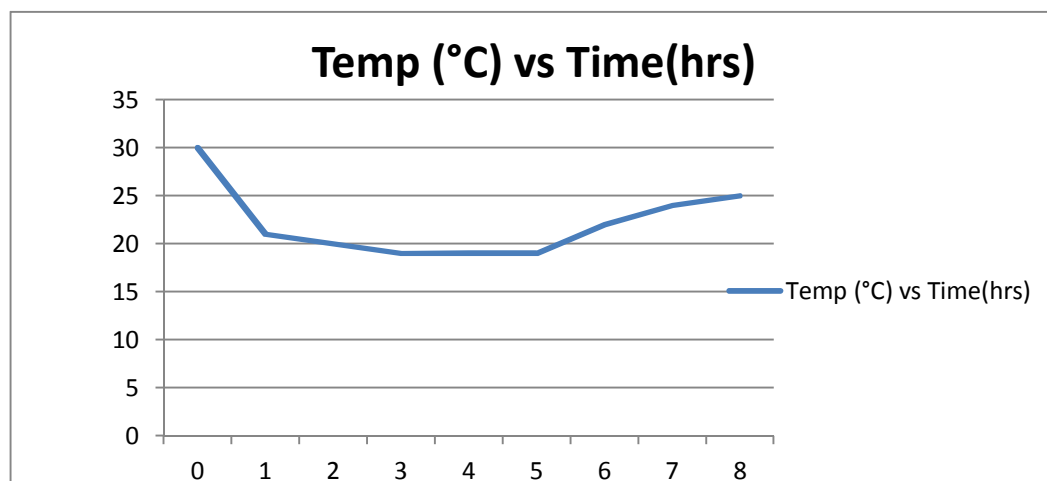
For Pump=9v

Totally Around=25V.

Working Time

6 hours complete cooling

After that there is a drop in temperature maintenance.



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Graph shows the temperature Vs Time testing for the performance calculation of the setup.

VI. ABOUT THIS SYSTEM

This system has more advantages on its performance and usage. The main advantage is this Bucket evaporative air cooler is a portable device and it can be carried easily from one place to another place. This system by the usage of sponge makes more efficient in its performance while on other hand by comparing the replacement with evaporative pad that an evaporative pad makes the cool air to come out only when there is a regular supply of water and the flow must be continuous. As the sponge pad makes more comfort in evaporation process its working is totally different from evaporative pads. The sponge material used is artificial fiber sponge- polyurethane sponge combined with scouring pad which has fine holes as an absorbing pore on it.

VII. ADVANTAGES

- A. Less expensive.
- B. Power consumption is limited to fan and pump.
- C. Refrigerant is water. No special Refrigerant.
- D. Ease of maintenance.
- E. Ventilation by air.

VIII. CONCLUSIONS

This concept makes an air cooler at very cheap and easily made by everyone with the easily available components. Thus it replaces the evaporative which is quite expensive and the new system by usage of SPONGE makes a development of a new concept for the projects Development in this field.

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