

# A Review on Development and Optimization of Humidity Controlled Air Cooler

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## ABSTRACT

Nowadays due to global warming there is increase in temperature every year and to reduce such issues more efficient air cooling system is required for human comfort. In the existing evaporative cooling system moisture content can't be regulated and so required comfort can't be achieved. To overcome such difficulty some material such as silica gel and calcium chloride which absorbs humidity can be useful. So air cooler can be modified to control humidity by using moisture absorbing material, or two stage cooling in which in first stage cooling and humidification and in second stage cooling and dehumidification will be carried out.

**Keywords:** Humidity Controlled, Air cooler, Descicant Material.

## I. INTRODUCTION

Air Coolers are used in peak summer season for cooling in rooms, offices, hotels and restaurants etc. In general Air Coolers are used for cooling similar areas and desert coolers are used for larger area<sup>[4]</sup>, but how to control the temperature as well as humidity.

Air cooler gives the cooling air but the cooling air is with lots of moisture having in it, so there will be lots of humidity in the any room where we are using the air cooler<sup>[5]</sup>. Climate control refers to the control of temperature and relative humidity in buildings<sup>[1]</sup>. Air cooler works on the simple working principle of evaporative cooling, in this as air comes in contact with water, air gets cooled by releasing heat to the water. The components used in air cooler is fan, blower, pump, cooling pad etc.

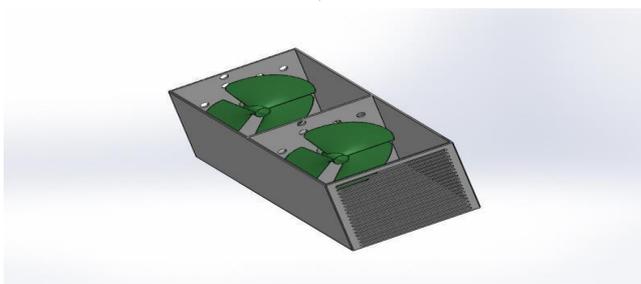


Human beings are sensitive to high humidity because human body uses evaporative cooling, enabled by perspiration, as the primary mechanism to rid itself waste heat. When there is more humidity in the atmosphere, sweat from the body evaporates at low rate which cause discomfort to a person. Because with decrease in rate of evaporation the rate of cooling of human body also reduces causing discomfort due to feeling of heat, and moisture, so it can be said that at high humidity conversion sweat into vapour is slow because there are already more amount of water particles present in environment which reduces temperature difference between sweat and surrounding atmosphere.

## II. METHODS AND MATERIAL

### Working Principle

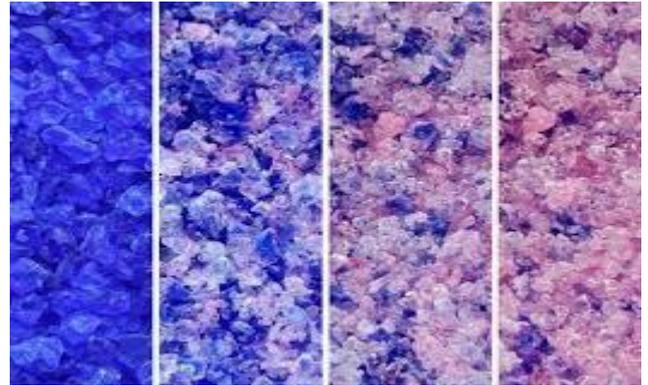
The upper surface has inlet for fresh water and outlet for cool water. The inlet water has temperature slightly more than that of the water spread over the sink. The submersible pump lifts the water from the tank and feed it to sprinkler, sprinkler sprays the droplets of water over the heat exchanger, and thus the transfer of heat occurs. As heat is always transferred from high to low temperature. The water comes in contact with air, the evaporation of water takes place thus the drought fan sucks the mixture of water vapours and air and it provide this mixture to the surrounding with help of duct. Duct is deliver the maximum cold air. For humidity control we are attaching desiccant material, which control excessive humidity from the coming air, so atmosphere will be suitable to human body.



### Desiccant materials[9]:

#### Silica gel:-

Silica gel is a moisture adsorbing material. It can adsorb water particles from the air. As its name suggest it is a form of silicon. Though its name is silica gel but it is not in the form of gel but it is in the form of solid. It is a common material come with some product such as shoe, or other electronic items to remove moisture from that product.



#### Clay Absorber :-

Clay absorbers offer a cheap alternative to absorbing moisture in a home or in any other space where moisture leads to moulds. Some homes that make use of clay bricks often do not get moldy because the moisture absorbent qualities of the clay remove the dampness that increases mold growth. There was one disadvantage to using clay absorbers, though. Its moisture absorption property is very low as compared to the other two types. For heavily humid areas, clay absorbers are not recommended. Other alternatives to clay



absorbers include coal, charcoal, rocks, and rough gravel

### Calcium Chloride :-

Perhaps the best moisture absorber is calcium chloride<sup>[9]</sup>, a mixture of chlorine and calcium. It has a very strong moisture absorbent property that makes it an ideal candidate for high humidity moisture absorption projects. Calcium chloride usually used in shipping goods and does a good job in keeping these goods dry during the whole duration of the trip.



### Wooden chips or saw dust:-

Wooden chips or saw dust can be used to adsorb the moisture from the humid air.



### III.CONCLUSION

The review shows that to reduce or adsorb the humidity the desiccant material can be used instead of other chemical absorber or mechanical means of absorption. From experiment we can say that wooden chips can be used for adsorbing

humidity, this is the best material to adsorb humidity as it is available free of cost .

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