

DESIGN AND FABRICATION OF 360 DEGREE AIR COOLER

¹Chaudhari Aniket, ²Patel Upesh, ³Patel Bhavik, ⁴Gamit Nihal,
⁵Prof. Dr. Kamlesh Chaudhari

Abstract: This paper is based on innovation to conventional coolers. In conventional or normal cooler we get one directional air flow only. This cooler is designed in such a way that the people sitting in any area in the room will get equivalent cooler air. The cubical cooling chamber consist of four cooling pads. The exhaust fan mounted above the chamber, below which the heating coil is mounted. Thus this cooler can be used as a heater in winter season and air cooler in a summer season.

Keywords: Exhaust fan, cooling pad, pump, frame, motor, humidity.

1. INTRODUCTION

1.1 Introduction of 360 degree air cooler

The Evaporative cooling is one of the earliest methods employed by men for conditioning their houses. Only in recent years, it has been put on sound footing thermodynamically. It is a process of adiabatic saturation of air when a spray of water is made to 360 EVAPORATIVE into it without transfer of heat from or to the surroundings. The initial investment cost of such a system is low & the operation is simple & cheap. Simple 360 EVAPORATIVE cooling is achieved by direct contact of water particles & a moving air stream. If the water is circulated without a source of heat & cooling, dry air will become more humid & will drop in temperature. In a complete contact process, the air would become saturated at WBT of the entering air. The air may be sufficiently cooled by 360 EVAPORATIVE process to results a considerable degree of summer comfort in climates of high dry-bulb temperatures associated with low relative humidity's. The minimum outdoor temperature required for successful 360 EVAPORATIVE cooling is above 35 c & another requirement is a relatively low.

1.2 Components of 360 air cooler

1) **AC motor:** Motor is an electrical machine that converts electrical energy into mechanical energy. In cooler it is used to rotate the exhaust fan and to remove the hot air from cooler.

Material: steel

2) **Pump:** The pump in the cooling system of a cooler that causes the water to circulate. The pump is mechanical device used to circulate the fluids.

Output: 1100L/h

3) **Cooling pad:** Evaporative cooling is a type of environment cooling techniques that cools the surrounding air using the water evaporation techniques. It is used in air cooler to cool the surrounding.

Material required: furnish grass

4) **Exhaust fan:** It is used to send cooled air to environment.

Material of fan: both side coated iron

5) **Water storage tank:** It is use to storage the water required for cooling.

2. METHOD OF COOLING USED IN AIR COOLER

Evaporative Cooling with Eco Cool Evaporative Cooling Pads is the ideal and most economical method of cooling. Evaporative Cooling is the process in which air is cooled by using the heat in the air to evaporate the water from an adjacent surface. A temperature reduction of 10 to 20°C (50-68°F) can be achieved by passing the hot fresh air through the wetted pads.

Direct Evaporating cooler:

Direct Evaporative cooling is simplest and most popular evaporative cooling system. It takes heat energy to change the water from a liquid into vapor. Direct evaporative cooling introduces water directly into air stream, usually with a spray or wetted media. The Water absorbs heat from the passing air, Which lowers dry-bulb temperature of the air. It also increase the moisture content of the air.

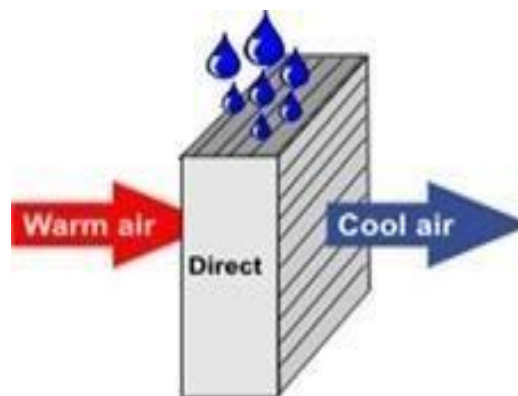


FIGURE 1: Direct Evaporative Cooling system

3. AUTOCAD DESIGN OF 360 DEGREE AIR COOLER

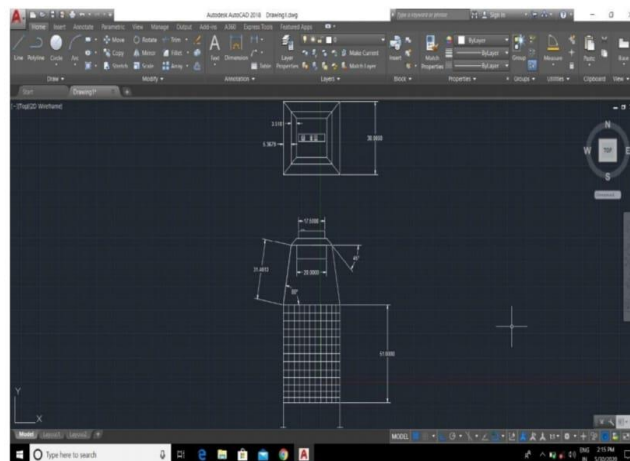


FIGURE 2:

4. MERITS AND DEMERITS OF 360 DEGREE AIR COOLER

MERITS: following are the merits of 360 degree air cooler

- Thermal performance it has been found out that some of performance improves thermal efficiency upto 19 percentage without affecting the torque.
- Emission reduction 360 degree cooler can decreases pollutants and greenhouse gas emissions upto 55 percentage or more.

DEMERITS: following are the demerits of 360 degree air cooler

- Power cost: the high cost of electric power increases the cost of Electric bill.
- Preparation of water vapor : preparation of some vapor blend are difficult in some cases and cause pollutants.

5. PROJECT OUTCOME

- It provide more cooling area compare conventional air cooler.
- It provide air cooling in all direction.
- In this evaporative cooler air and water is used. It is most environmental friendly and effective cooling system.

REFERENCES

- [1] Design Optimization and Installation of the Evaporative Cooler, Md. Almostasim Mahmud, Dr. Md. Alamgir Hossain, M.A. Muktadir.
- [2] Design and Development of Solar Powered Air Cooler. By Vijaykumar Kalwa¹, R. Prakash.
- [3] Design of Evaporative Air Cooling System for Seminar Hall. By Mrs. Wagat S Giri, Mr. Kapil Aglawe, Mr. Amol Gadge.
- [4] Design of Air Cooling System for College Auditorium, S.S. Wane and M.B. Nagadeve.
- [5] Design and Fabrication of 360 cooler cum Heater. By Akhilesh Yadav, Rajatkumar Bachchan, Sankesh Toraskar, Dattaprasad Tendolkar, Prof. Ramankumar
- [6] A Review of Evaporative Cooling Technologies. By O. Amer, R. Boukhanouf, and H. G. Ibrahim
- [7] MODERN EVAPORATIVE COOLER. By Miss. Namrata Govekar, Mr. Akshay Bhosale, Mr. Amol Yadav.