

Multi-Purpose Cooler

Nikita Karpe¹, Ganesh Kondamangal², Soham Pawar³, Sana Beskar⁴, Dr. Srinidhi Campli⁵

Students, Department of Mechanical Engineering^{1,2,3,4}

Professor, Department of Mechanical Engineering⁵

JSPM'S Rajarshi Shahu College of Engineering, Pune, India

Abstract: *The current cooling systems incorporate active cooling systems where use of Refrigerants are mandatory which play a dominant role in Ozone depletion. Our motive is to Design, Manufacture and Evaluate Multi-Purpose Exhaust type cooler which can be employed for space cooling as well as refrigeration. The focus in this study has been utilization of cooled water for refrigeration of foodstuff such as vegetables, fruits and beverages.*

Keywords: Exhaust fan, cooling Fan, Cooling Pad, Galvanized Steel Sheet

I. INTRODUCTION

Refrigerants serve as working fluids in air conditioning, heat pumps and refrigeration systems by absorbing and releasing heat within a closed refrigeration cycle while undergoing continuous phase transitions between gas and liquid states. Thomas Midgley (1928) He invented CFCs and HCFCs, but the widespread use of these refrigerants poses a serious threat to the earth in terms of ozone depletion and global warming. McNeill says that Midgley "has a greater impact on the atmosphere than any other single organism on Earth" because of free alternatives, particularly hydrofluorocarbons (HFCs) such as R-410A, R-407C and R-134a.) are attracting attention. Water is one of many available refrigerants with unique properties and refrigerant number (R718). Strictly speaking, evaporative cooling technology also uses water as a refrigerant, but it continuously evaporates to cool and humidify the airflow, rather than repeatedly evaporating and condensing in a closed-loop system. Water is one of nature's most powerful refrigerants and has a very high latent heat of vaporization (2501 kJ/kg at 0 °C), making it ideal for this purpose. Evaporation of water at a rate of 1 l/h thus yields a cooling power of up to 695 W. The main purpose of developing a complex system of air coolers is to provide a comfortable environment for the occupants. During hot weather, humans need more cold water. All these systems can cool not only cold water but also indoor air in hot climates according to your needs. Air cooling is a technology that enables indoor climates by lowering temperatures, especially in arid regions of the world. As mentioned earlier, exhaust fans remove unwanted odors, moisture, smoke, and other contaminants from the air. Any presence of steam or moisture in the air can cause mold to form. Using an extractor fan will help keep your home mold-free by allowing the steam to escape. Exhaust fans improve indoor air quality by removing moisture, odors, and pollutants. Ensure adequate ventilation of areas where these air quality degrading substances may accumulate. Stagnant air is removed from your home and conditioned air fills your room. It is a multi-purpose exhaust cooler that also has a cooling function, so it has both cooling and cooling functions. Single refrigerator.

II. LITERATURE SURVEY

1]Faizan A, S. Feroz, Waqar Khan, Nageswara Rao Lakkimsetti, "Experimental Evaluation of Multipurpose Evaporative Coolers for Refrigeration and Air Cooling" (2023). manufacturing and testing. It can be used for both refrigeration and air cooling, and can also be used for indoor cooling. The focus of this study was the use of chilled water produced during the air-cooling process of the dessert cooler. The purpose of this cold water was to cool food such as fruits and drinks. The cooling area considered here is the storage box inside the water tank of the dessert cooler. This storage box is cooled by heat transfer between the walls of the storage box and the surrounding water in the dessert cooler tank. Inside the storage box he tested three cooling loads of 3 W, 6 W and 9 W. The experiment was conducted in the climate of the Eastern Province of Saudi Arabia. Based on this research result, the performance of the proposed cooler is considered to be quite good. It was found that the air was cooled by upto 6°C and the temperature inside the

storage box was reduced by upto 9.2°C. The highest coefficient of performance of the multi-purpose evaporative cooler is 8.6.

2] Avdhesh Tyagi, Satyaveer Singh, Satyendra Chaturvedi, Rohit Sahu, “Experimental Analysis of Multi-Purpose Refrigerator Systems”, December 2017 the main objective of current research is to provide a multi-purpose warming device that utilizes waste heat generated from refrigerators. That's it. Home Refrigerators, Home Refrigerators provide additional opportunities in the form of warming rooms. A home refrigerator was modified for experimentation, and the waste heat generated from the refrigerator was used to keep the temperature of the warming chamber higher than the ambient temperature. Waste heat is heat loss that increases the temperature in a room and causes discomfort to people. This paper removes exhaust heat and keeps the room warm and comfortable. As a result, we found that the same power could be used to heat food, significantly reducing the use of the oven and reducing overall power consumption.

III. EXPERIMENTAL SETUP

3.1 AIR COOLER FAN SPECIFICATION

Company Name – BLUE TECH Home Appliances

Turbo Series

An ISO 9001: 2008 Certified Company

Voltage: 230V 50HZ AC

Sweep 225 MM

30*30 cm

Contents: 1 Unit

Exhaust Type

Actual MRP 1325 ₹ We get it in 1250 ₹



3.2 EXHAUST FAN SPECIFICATION

Company Name – Tally

Turbo Series

170*170*51 mm [15*15cm (6 inch)]

AC AXAL FAN

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Voltage: 220V/240V
 Frequency: 50/60 Hz AC
 Current: 0.25amp
 Power: 37W
 Contents: 1 Unit
 Exhaust Type
 Actual MRP 950 ₹ We get it in 950 ₹



3.3 AIR COOLER LOWER TRAY SPECIFICATION

SR.NO. IN (MM)	PARAMETERS	MEASUREMENT
1	LENGTH	660
2	BREADTH	460
3	HEIGHT	120

Type of Material used – GI Sheet



3.4 AIR COOLER UPPER TRAY SPECIFICATION

SR.NO. IN (MM)	PARAMETERS	MEASUREMENT
1	LENGTH	570
2	BREADTH	360
3	HEIGHT	85

Type of Material used – GI Sheet



3.5 AIR COOLER

SR.NO.	PARAMETERS	MEASUREMENT IN (MM)
1	LENGTH	550
2	BREADTH	350
3	HEIGHT	600

Types of Material used – CI, Wood, Fibre, Etc

3.6 REFRIGERATION BOX

SR.NO.	PARAMETERS	MEASUREMENT IN (MM)	QUANTITY
1	LENGTH	220	2
2	BREADTH	100	2
3	HEIGHT	250	2

Types of Material used – CI, Wood, Fibre, Etc

IV. METHODOLOGY

- To design and develop a Multi-Purpose Exhaust cooler using appropriate techniques and materials.
- To make Multi-Purpose Exhaust Cooler we required some Wood /Fibre material, Exhaust Fan, Stabilizer, Cotton's small layer clothes from which we can absorb water for a long time of spam, PVC wounded Wires, Mesh, Galvanized iron sheet, etc.
- After gathering all these materials we have assembled them as per our design.
- The main objective of preparation of this action plan is to minimize import of room air cooler by increasing domestic production.
- To evaluate the Cooler for thermal Cooling rate analysis using basics of Heat transfer

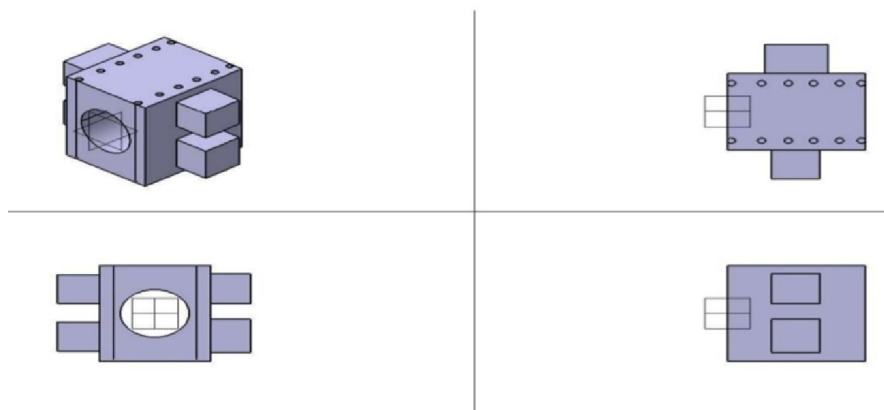


Fig . CAD model of multipurpose cooler
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V. CONCLUSION

You can get fresh cold air without any negative impact on the environment. The System's Refrigeration equipment stores vegetables, fruit, bottled water, dairy products, and more.

Stays fresh and healthy longer than our free space. Using water as a refrigerant is a great initiative that does no harm to the environment or humans.

REFERENCES

- [1]. B.O.Bolaji, Z.Huan "Ozone depletion and global warming: Case for the use of natural refrigerant",ISSN:1879-0690, Volume 18, February 2013,<https://doi.org/10.1016/j.rser.2012.10.008> .
- [2].Faizan Ahmed, S. Feroz, Waqar Khan, Nageswara RaoLakkimsetty "Experimental assessment of multi-purpose evaporative type cooler used for refrigeration and air cooling"ISSN: 2214-7853,Volume 80, Part 3, 2023,<https://doi.org/10.1016/j.matpr.2021.07.129> .
- [3]. Avdhesh Tyagi, Satyaveer Singh, Satyendra Chaturvedi, Rohit Sahu, "Experimental Analysis of a Multi-Purpose Refrigerator System", ISSN: 2319-8354,Volume 06, December 2017