

Installment of an air conditioning unit in a computer laboratory

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Abstract— Increasing temperature causes distress and discomfort thus reducing efficiency of the student and for better life of the computer units an air conditioning unit is to be installed in the computer lab room. Air conditioning systems are designed to fulfill the indoor environmental requirements of all the entities in the conditioned space. Mostly three types of air conditioning systems are used, namely, window, split and central. This paper includes the procedure involved in the fabrication of an air conditioning unit and specified components following the design.

Keywords— air conditioning systems, fabrication, components.

I. INTRODUCTION

The American society of Heating, Refrigeration and Air – Conditioning Engineers (ASHRAE) has defined air – conditioning as the process of treating air to control simultaneously its temperature, humidity, cleanliness, quality and distribution to meet the requirement of the occupants, process or product in the conditioned space [1]. Air conditioning is used all around the world for both domestic and commercial environments. Air conditioning is used to provide a comfortable interior environment; however, it is also used to cool and dehumidify rooms filled with heat-producing electronic devices, such as computer related equipment.

Air conditioners often make use of a fan to evenly diffuse the conditioned air to a space occupied by heating entities to improve thermal comfort and quality of indoor air. The cooling is achieved by a refrigeration cycle decided by the designer.

II. COMPONENT DESCRIPTION

With the completion of design documents the next step for the manufacturer is to decide the components with the best rating for longer operational life and efficiency. And selecting the various processes required for manufacturing the unit. For proper cooling effect complete insulation is to be provided to avoid leakages and thus causing decreasing efficiency.

Description of the components:-

1. Compressor: - It circulates the refrigerant through the coils of the indoor and outdoor unit i.e. the evaporator and condenser coil. It pressurizes the refrigerant, changing its phase. Rotary compressor is easy to maintain.

Compressor used: - Rotary compressor

Capacity: - 2 Tr



Fig. 2.1 Rotary compressor

2. Condenser: - A condenser unit in air conditioning system works as a heat exchanger section that cools down and condenses the incoming refrigerant vapor into liquid thus decreasing its temperature.

3. Metering device: - Metering device is used to provide a pressure drop point. This device has two jobs:

- It holds condensed refrigerant back; and
- It feeds evaporator with refrigerant.

When liquid with high-pressure enters a metering device, pressure begins to fall as the temperature remains constant until it reaches saturation pressure-temperature. At this instant, both the pressure and temperature continue to fall to the evaporator pressure-temperature.

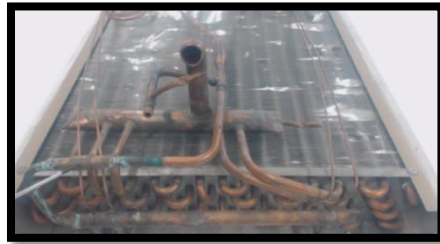


Fig.2.2: Metering device

4. Evaporator coil: - An evaporator coil, also called the evaporator core, is the part of the system where the cooling occurs. Evaporator coils are made from good heat conducting materials like copper, steel, and aluminium. A panel is made up of some U-shaped tubes. Thin pieces of metal are aligned in this panel to increase the surface of the coil.



Fig. 2.3 Evaporator Coil

5. Refrigerant: - Refrigerants are elements that have a low boiling point. This liquid makes cooling possible. It is charged into the system at the end.

Refrigerant used: - R22



Fig.2.4 Refrigerant

Electrical components.

- Capacitor: - for boosting both the fan and compressor motors.
- Wires: - for circuit connections.
- Fan motor:- for rotation of the fan.
- Contactors: - it is an electrical relay that regulates the electricity flow to components in the AC unit. It sends voltage to condenser and fan motor.
- Terminal clips:-for electrical connections.

III. FABRICATION STEPS

1. Creating parts for encasement from sheet metal.
2. Punching the sheet metal to the desired shape and form.
3. Cleaning the parts for powder coating.
4. Powder coating of the sheet metal casing.
5. Buying the evaporator and condenser tubes.
6. Joining the tubes with compressor.
7. Charging the refrigerant into the system.
8. Checking for the quality of the product.

IV. CONCLUSION

New processes were learned hands-on thus giving us an idea of real manufacturing practices. Also we got to understand the market conditions and practices while looking for the material. Thus giving us a proper understanding of the industrial aspect of engineering.

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