**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI**

**COLLEGE OF ENGINEERING**

**DEPARTMENT OF MECHANICAL ENGINEERING**

**ME 396-MECHANICAL ENGINEERING LABORATORY III**

**A REPORT ON COMMERCIAL AIR-CONDITIONING**

**BY GROUP J1**

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**TITLE:** COMMERCIAL AIR CONDITIONING

**OBJECTIVE**

Operate the dehumidifier and measure dehumidification rates

Reading the pressure drop on the inclined manometer

**INTRODUCTION**

In a complete air-conditioning system, the central unit serves as an air handling center. It supplies the needed amount of fresh air, preheats the mixed outdoor and return air streams whenever it is necessary. It filters, washes and cleans the air, dehumidifies it, reheats it to the correct humidity ratio and transfers it back into the conditioned place.

This system is composed of the following components

1. Intake of outside air 2.preheater 3.return air duct

4. Filter 5.dehumidifier system 6.heating coil

7. Fan 8. Ducts 9.air outlet 10. Refrigeration machine

11. Water cycle 12.boiler 13.cooling tower

**SUMMARY**

The experiment involves studying some information given on topics involving air-conditioning. Through the course of studying some questions are asked on what has been learnt with possible answers given for the correct one to be chosen. After an experiment is carried out on the setup and the results obtained are entered into a given table.

**THEORY**

The term dehumidifier is that part that dries and at the same time cools the supplied air. Usually the component is called an evaporator when the fluid id inside a two-phase refrigerant. When chilled water is used as the cooling fluid, a component called fan coil unit is used.

In a direct expansion unit the dehumidifier is located next to the air-conditioned space. The refrigerator expands directly into the evaporator. It consists of the minimum number of elements needed to operate the cycle,

The dehumidifier defines the name for the type of air conditioning system. Examples are Dry expansion systems-DX units: these systems are self=contained units used for small to large areas. All the basic elements needed for air conditioning are included in a single casing. The control of the self-control type is usually on-off type where the fan operates continuously while the compressor may stop. They are used mainly in small or large rooms, in private residences or offices.

All-water systems are either individual-room or multi=space air-conditioners connected to a remote central unit, the water is cooled I a refrigeration system and circulated through either one or more fan coil units and back to the chiller.

All-air systems are the conventional central air-conditioning units. The conditioned air is treated in the central remote place while it is transferred through conduits to the conditioned places. The temperature control of different zones is accomplished by reheating the supplied air-stream or by restricting the air-flow.

Air-water systems are centralized ventilating systems with ducts distribution combined with a chilled water system. They are advantageous in places where good ventilation and fresh supplied air are preferred such as hotels, small medical centers and office buildings.

Other components of the complete system are the pre-heaters, re-heaters and air washers. They are used when it is necessary to maintain different zones at different temperatures and humidifies using the same plant. For multistep processes air must pass through sequential steps to obtain the correct final condition.

**APPARATUS**

Dar-2400 Basic Refrigeration Test Module

Logarithmic P-h chart for HFC-134a refrigerant

Writing pad

Pencil and ruler

Stopwatch

**SAFETY AND PRECAUTIONARY MEASURES**

1. Check that the system communication cable to computer printer port LPT1. Connect if not attached.

2. Connect the test system to the power line and set the main switch to the “ON” position.

**PROCEDURE**

1. Set up LOAD 1 button to 100W on the basic unit to start the system

2. Set up your system at RT. At 15 °C and low fan speed TEV control and RT control. Press the system ON button.

3. Wait until the room temperature reaches 15°C at DBT1

4. Read WBT, DBT2 and WBT2 and read humidity ratio on the psychometric chart.

6. Operate LOAD 2 at 100 watts. After five minutes read again DB1, DB2 and WB2.

**ANALYSIS AND CONCLUSION**

The DAR-2400 training is an all-air system. Two heaters are present in the system. One heater is installed between the cooling coil and the after spray and the other one is installed after the water spray unit. The second heater serves as a simulator to sensible heat load. The spray unit adds the latent heat amount to simulate latent heat load. These components from the heat load generator for the system.

**REFERENCES**

1. Tech. Prep. Lab. (DAGEM SYSTEMS, Air-conditioning and refrigeration department)

2. YUNUS A. CENGEL 1998 Heat Transfer: A Practical Approach International Edition, McGraw Hill