

Preliminary design of an air cooler - heater, for use in central cooling and heating applications for buildings.

# Abstract

Nowadays with the modern way of life and with the rapidly temperature and climate changes air conditioning has an important role in manufacture and new residential and commercial buildings. In order to feel comfortable in a place it needs to be heated and cooled at a comfortable constant temperature, surrounded by fresh air and kept at a comfortable and safe humidity level. To provide these conditions heating, cooling and ventilation must be combined. The main aim of this dissertation is calculate a central air handling unit which will combine all the proper characteristics in order to provide the desirable conditions. The study will be done for a chocolate factory and the specific room will be a storage place in which the products must maintain in specific temperature. At the end of the project with will have chosen an air cooler heat exchanger (air handling unit) based on our requirements and all of its characteristics will be analyzed. All the technical, geometrical, fluids characteristics and heat exchangers' size and type will be given. Also it will take place an economical evaluation. The conclusion of this project is evaluate the characteristics and effectiveness of the system we have

chosen and if this system is reliable, safe and comfortable.

# **Aims and Objectives**

The aim of this project is to be studied and calculated in detail a central air handling unit for a specific space depending on space requirements and elements. In this project, all the factors that are important in air handling technology will be analyzed such us effectiveness and economy issues.

The following is a provisional list of objectives: Describe the general characteristics and applications in an air conditioning system.

Describe analytical the specific requirements like temperature and relative humidity that the space requires.

Make a load estimation assessment about the The case study will lead us to think space we need to cool.

Design an air handling unit with all the technical, geometrical, fluids characteristic.

Choice of the additional devices and acces ories that the unit needs to have like special filters, sound traps and motors.

Make a drawing of the unit in which all its characteristics can be clearly observed. Evaluate the effectiveness of the unit and make

cost estimation.



# Proposals

ways to reduce energy consumption and use technology for energy savings such as heat recovery and free cooling. Effectiveness of the unit will be analyzed as well as operation and installation methods. Economical estimation and evaluation will be important also.

### Theoretical background of air conditioning

The first think in this project is to give information and about the history of air conditioning and its development. Especially we will focus on the principle of cooling and we will study the development of these applications from 1980 until now. Also we will give details about ventilation requirements all we will focus especial in industrial buildings. The first idea for a modern air conditioner came from Willis Carrier in 1902. The machine was used to cool air and also to keep the humidity lower to 55% in a publishing corporation in New York. It was the first ime were it was concerned that the humidity control is acceptable. After this invention air conditioners began to bloom. The first air conditioners were used for industrial buildings. The first air condition for buildings installed at 1914. The first units were large, expensive and used ammonia as coolant. In 1922 we had two breakthroughs. The ammonia has been replaced with dyeline and a central compressor has been added in order to reduce the size of the unit. In a short time, air conditioners were installed in office buildings, department stores and cars. Thomas Midgley created freon gas in 1928 which was safer for the humans but was later found to be harmful to the atmosphere. After 1994 several non ozone depleting refrigerants have been developed like R410A. Now we have a variety of air conditioners. We have different systems like air to air, water to air, water to water etc. innovation in air conditioning technologies continue with much recent emphasis placed on energy efficiency and improving indoor air quality.

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