

Refrigeration and Air Conditioning

Chapter 1 Introduction to Air Conditioning System and Components

by

Dr. Mohd Hazwan
Faculty of Mechanical Engineering
mohdhazwan@ump.edu.my



Chapter Description

- Aims
 - Introduce the mechanism of various basic heat transfer and the working fluid thermodynamics, vapour compression and absorption system of refrigeration.
- Expected Outcomes

Student should be able to:

 - Explain the First Law and Second Law of Thermodynamics.
 - Explain the system of refrigeration.
- References



Introduction

What is REFRIGERATION?

The process of maintaining and achieving a temperature below that of the surroundings.



Introduction

Main objective of REFRIGERATION

To cool a space to a required temperature.



Introduction

Usage of REFRIGERATION

- To preserved the freshness of food
- To provide thermal comfort to human beings.

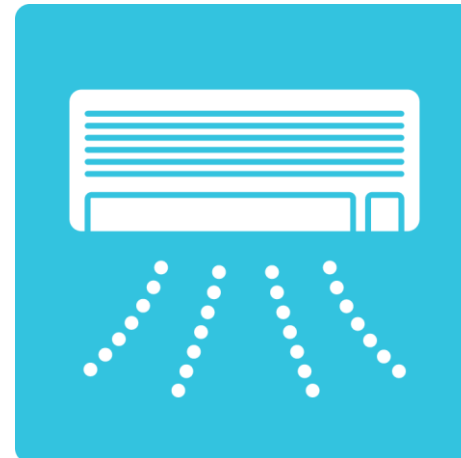


Photographer: ViktorHanacek.cz

Introduction

What is AIR CONDITIONING?

The treatment of air so as to simultaneously control its temperature, cleanliness , moisture content, odour and circulation, as required by a process, occupants, or products in the space.



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Introduction

Is there any NATURAL REFRIGERATION?



Created by: Gerd Altmann

Introduction

Natural Refrigeration 1: Nocturnal Cooling

- Popular in India before refrigerator was created.
- Method: Expose a thin layer of water in a shallow earthen tray to the night sky. For insulation, a 0.3 m thickness of compacted hay was used.
- Mechanism: Water loss heat by radiation to the stratosphere (around -55°C). The water freezes to ice in the morning.



Introduction

Natural Refrigeration 2: Evaporative Cooling

- Cooling process using water evaporation
- In hot countries, water stored in earthen pots to obtained cooler water.



Introduction

How we obtained ice in the olden days?

- Bring ice from colder regions during winter.
- Stored ice in ice houses during summer.
- Use nocturnal cooling for cooling water to ice during the night.



Introduction

Ice Houses

- Used in Europe, Iran, and America
- Insulating materials: Sawdust or wood shavings.



Source: <https://commons.wikimedia.org>

Introduction

Transportation of Ice in America

- Transport from North America to southern part using the train.
- Ice was insulated by 0.3 m of cork insulation
- In 1872, America exported 225,000 tonnes of ice to various countries like Australia and China.



Conclusion

- Refrigeration system was done naturally before the invention of artificial refrigeration system.
- In the olden days, ice can be obtained during summer by storing the ice in the ice houses.
- Selling ice was a large profit business during the 1880s.



Author Information

Other relevant information (if any)

#author may apply your own creativity and innovation where it is appropriate

