



**ABSORPTION AIR CONDITIONING SYSTEM  
FOR  
HOME RESIDENTIAL APPLICATION**

**NAJMUL WATAN BIN BAHARUDIN  
(2002241908)**

A thesis submitted in partial fulfilment of the requirement for the awards of Bachelor  
Engineering (Hons.) in Mechanical

**Faculty of Mechanical Engineering  
Universiti Teknologi Mara (UiTM)**

**APRIL 2005**

## **ACKNOWLEDGEMENT**

In the name of Allah Most Benevolent and Most Merciful,

Praise to Allah S.W.T we have completed this project. We are grateful to many individuals for their assistance in the completion of this project. Firstly, we would like to convey our utmost sincere appreciation to our project advisor, Assc. Prof Dr. Ir. Ahmed B. Jaaffar for being very supportive and for his guidance, advice, comment, assistance and patience upon the completion of this project.

Many thanks to GAS DISTRICT COOLING (PUTRAJAYA) SDN BHD for giving some guideline and allowed us to visit their plant. We are also very gratefully acknowledged to Mr Thahir Sk Abd Aziz and Mr Hj. Abdul Jalil Abdul Malek (from GDC Putrajaya) because their guidance on how the air conditioning system that really meaning full and operated including its function to control the temperature, system, maintenance, concentration, problem involved etc. It could not have been done without their help and assistance.

We are remarkable thankfulness to many people especially to our family and classmates for their support. To those who had given their cooperation directly or indirectly to the success of this project, we also want to thank you for all your help.

APRIL 2005

Najmul Watan b. Baharudin

## **ABSTRACT**

In this thesis, chapter 1 and 2 address the introduction or general overview of body comfort, air conditioning system and absorption process. Prior to chapter 2, the objectives and scope of this project are being described in the earlier pages. In chapter 3, the detail cycle of absorption system either ammonia-water system or lithium bromide-water system are explained. Furthermore, the comparative studies between these techniques are included. Chapter 4 introduces the working medium applicable in the selected absorption; by means of lithium bromide-water solution. This is including the theory, analysis, several working medium, selection on refrigerant and absorbent and solution graphs. In chapter 5, there are several basic components literature reviews and components. Chapter 6 is more detail on analysis of absorption system according to theoretical concepts like first and second law, energy balance analysis, components analysis, heat transfer analysis pressure and concentration analysis. Furthermore, after all the formulations are established, in chapter 7, the analytical approach is used. However, before that the design specification of the system is important. This is because design specification is a guide line to the design procedure. In chapter 8, there are several improvement made by earlier researcher and manufacturers are included. This is a guide line made for further development of this system. Chapter 9 will be laboratory analysis, in which in this chapter simple analysis upon to the parameters like concentration and pressure are being examined. Chapter 10 will be result and discussion upon to this system. Furthermore, chapter 11 is the conclusion for this project Interrelation with chapter 8; chapter 12 will concentrate on recommendation made by the authors. This is because recommendation made is a further trail guide before the actual solar absorption system is established.

## TABLE OF CONTENT

	<b>CONTENTS</b>	<b>PAGE</b>
	TABLE OF CONTENTS	viii
	LIST OF TABLES	xiv
	LIST OF FIGURES	xv
	LIST OF ABBREVIATIONS	xix
<b>CHAPTER I</b>	<b>INTRODUCTION</b>	
	1.0 Introduction	1
	1.1 Objectives	2
	1.2 Scope of Project	3
	1.3 Significant of Project	3
	1.4 Literature Review	
	1.4.1 Introduction	4
	1.4.2 Development of Absorption Air Conditioning System	5
	1.4.3 Market Research	6
	1.4.4 Methodology	7

## **CHAPTER II INTRODUCTION OF ABSORPTION**

2.0	Human Comfort Environment	12
2.1	Air Conditioning	14
2.1.1	Selection of Air Conditioning System	15
2.1.1.1	Geographic Location and Climate	16
2.1.1.2	Design Criteria and Quality	16
2.1.1.3	Initial Investment	17
2.1.1.4	Energy Consumption and Operating Cost	17
2.1.1.5	Building Characteristic	17
2.2	Principal of The Absorption	18
2.3	Basic Absorption Air Conditioning System	19
2.4	History of Air Conditioning and Absorption System	21

## **CHAPTER III ABSORPTION SYSTEM**

3.0	Introduction	23
3.1	Comparison of Absorption System to The Compression System	24
3.2	The single Stage Continuous Vapour Absorption System	27
3.2.1	Lithium Bromide-Water Absorption System	27
3.2.1.1	Basic Cycle for Absorption System	27