



**INTERNAL LOADS EFFECTS ON THE AIR CONDITIONING SYSTEM**

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*In the name of Allah SWT  
The Compassionate, the Merciful  
Praise be to Allah, Lord of the Universe,  
And Peace and Prayers be upon  
His Final Prophet and Messenger*

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## ABSTRACT

Internal loads effects on the air conditioning system are important in determining the comfort condition. This is done by evaluating the heat distribution. The internal loads' effects depended on how much the sources of heat released its energy. As the result, the heat distribution will affect the room properties such as temperatures, relative humidity and the dew point. Thus, it is related with the comfort level. This is due to the fact that the compressor would be automatically on and off as long as the air conditioning system was switched on. The more heat released by the lighting bulbs and the equipments means the more energy consumed by the compressor in order to keep the space as comfortable as wanted. Hence, to maintain the comfort level, equivalence energy consumed needed to remove the heat released by the lighting bulbs and the equipments. And it could be elaborated in the term of the electrical usage of the compressor as it responded with the condition. This could lead into the determination of the general characteristics and heat distribution and the analysis of the two sources of the internal loads (equipments and lighting). In conclusion, it is found that the internal loads had affected the air conditioning system in the term of temperature changes and the electrical usage by the random heat distribution. The internal loads in the heat-released term, had affected the temperature and comfort condition and in order to maintain the condition, equivalence energy consumed were needed.

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## CHAPTER I

### INTRODUCTION

#### 1.1 Preface

The primary function of air conditioning is to maintain conditions that are conducive to human comfort, or required by a product, or process within a space. To perform this function, equipment of the proper capacity must be installed and controlled throughout the year. Type of control is determined by the conditions to be maintained during peak and partial load though it is impossible to measure either the actual peak or the partial load in any given space; these loads must be estimated. If the building facilities and the actual instantaneous load within a given mass of the building are carefully studied, an economical equipment selection and system design can result, and smooth, trouble free performance is then possible. In air conditioning system, one of the fundamental diagnoses that should be considered is the diversity of internal load such as occupancy (human), equipment, lighting and other heat exchanges. Basically, the smaller the space means the less the diversity.

The human body through metabolism generates heat within itself and releases it by radiation, convection and evaporation from the surface, and by convection and evaporation in the respiratory tract. The amount of heat generated and released depends on the surrounding temperature and on the activity level of the person. The normal body processes are performed most efficiently at a deep tissue temperature of about 37°C; this temperature may vary only through a narrow range. However, the human body is capable of maintaining this temperature, through a wide ambient temperature range, by conserving or dissipating the heat generated within itself. In detail, the heat released by human bodies is differing regarding to their gender, age, surrounding temperature, activity, clothing, continuous occupancy (or otherwise) and others. In order to reduce the heat released, the metabolic rate should be reduced and for example through providing a continuous comfort condition.