# Experimental Investigation of Natural Convection Heat Transfer in Tilted Partially Open Cavities



**BY**
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A thesis submitted to the Department of Mechanical Engineering in Partial fulfillment of the requirement for the degree of **Master of Science in Mechanical Engineering**



DEPARTMENT OF MECHANICAL ENGINEERING
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# CERTIFICATE OF APPROVAL

The board of examiners hereby recommends to the Department of Mechanical Engineering, Bangladesh University of Engineering and Technology (BUET), Dhaka, acceptance of the thesis, "**Experimental investigation of natural convection heat transfer in tilted partially open cavity**", submitted by **Md. Zeaur Rahaman**, in partial fulfillment of the requirement for the degree of Master of Science in Mechanical Engineering.

------------------------------ 27.06.2007

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# ACKNOWLEDGEMENTS

The author expresses his deep gratitude and indebtedness to his supervisor, Dr. Md. Imtiaz Hossain, Professor, Department of Mechanical Engineering, BUET, Dhaka for his continuous guidance, supervision, and invaluable suggestions during the research work. His constant encouragement and support is a great source of inspiration and shall be recalled by me in all of my future activities. The author acknowledges his profound gratitude to Dr. Md. Quamrul Islam, Professor and former Head and Dr. Md. Maksud Helali, Professor and present Head, Department of Mechanical Engineering, BUET for their kind cooperation and providing all laboratory and other facilities. Special thanks are for Nurun Nahar Nargis, Lecturer, Department of Mechanical Engineering, BUET for her invaluable suggestions. The author is extremely grateful to BUET authority for providing financial assistance to the research work.

The author would like to convey his heartiest thanks to all laboratory assistance specially the staff of Heat Transfer lab, Welding shop, and Wood shop for their co-operation during the fabrication of the set up and preparation of the thesis work.

# ABSTRACT

An experimental investigation was carried out to determine the heat transfer coefficient from a rectangular tilted cavity to the ambient due to the buoyancy driven flow in the cavity. The cavity is partially open from one side. All the walls of the cavity are adiabatic except the wall facing the cavity opening which is heated at a constant heat flux. Three different geometrical arrangements for the opening were investigated: (1) high wall slit, (2) low wall slit and (3) uniform wall slots. Each opening arrangement was studied at opening ratios of 0.25, 0.50, and 0.75. The average heat transfer coefficient between the cavity and the surrounding air was estimated for each geometrical arrangement for various tilt angles of the cavity, measured from the vertical direction, ranging from -90 deg to +90 deg with increments of 15 deg. The results are presented in terms of the average Nusselt number for different values of the above experimental parameters. Conclusions are derived for the effect of changing the tilt angle or the opening ratio of the cavity on the average heat transfer coefficient between the cavity and the ambient air.

# NOMENCLATURE

| Symbol | Meaning | Units |
|---|---|---|
| a | Height of aperture | m |
| AR | Cavity aspect ratio | Dimensionless |
| B | Width of the cavity | m |
| $F_{pa}$ | Configuration factor | Dimensionless |
| Gr | Grashof number for cavity | Dimensionless |
| h | Convective heat transfer coefficient | $W/m^2$-K |
| H | Height of the cavity | m |
| I | Electric current | A |
| k | Thermal conductivity of air | W/m-K |
| $k_w$ | Thermal conductivity of packing-wood wall | W/m-K |
| L | Length of the cavity | m |
| Nu | Nusselt number | Dimensionless |
| OR | Cavity opening ratio | Dimensionless |
| Pr | Prandtl number | Dimensionless |
| q | Convective heat transfer rate | W |

| | | |
|---|---|---|
| $q_c$ | Conductive heat loss rate | W |
| $q_r$ | Radiation heat loss rate | W |
| Ra | Rayleigh number | Dimensionless |
| s | Distance along the wall | m |
| T | Temperature | $^{o}c$ |
| $T_p$ | Average temperature of hot wall | $^{o}c$ |
| $T_\infty$ | Ambient temperature | $^{o}c$ |
| t | Thickness of packing-wood wall | m |
| V | Voltage | V |
| $\alpha$ | Tilt angle of cavity, Diffusivity | Degree,$m^2/s$ |
| $\beta$ | Coefficient of volume expansion of air | 1/K |
| $\epsilon$ | Emissivity of the heated wall | Dimensionless |
| $\upsilon$ | Kinematic viscosity of air | $m^2/s$ |
| $\sigma$ | Stefan-Boltzmann constant | $W/m^2K^4$ |

# CONTENTS

# CHAPTER ONE

# INTRODUCTION

## 1.1 General

The science of heat transfer is concerned with the analysis of the rate of heat transfer taking place in a system. It has long been established by observations that when there is a temperature difference in a system, heat flows from the region of high temperature to that of low temperature. Since heat flow takes place whenever there is a temperature gradient in a system, knowledge of temperature distribution in a system is essential. Once the temperature distribution is known, the heat flux, which is the amount of heat transfer per unit area per unit time, is readily determined from the law relating the heat flux to the temperature gradient.

Heat transfer phenomena play an important role in many industrial and environmental problems. There is not a single application in the energy production and conversion that does not involve heat transfer effects in some way. In the generation of electrical power, whether it be through nuclear fission or fusion, the combustion of fossil fuels, magnetohydrodynamic processes, or the use of geothermal energy sources, there are numerous heat transfer problems involved therewith. These problems involve conduction, convection, and radiation processes and relate to the design of systems such as boilers, condensers, and turbines etc. One is often confronted with the need to maximize heat transfer rates and to maintain the integrity of materials in high temperature environments.

There are many heat transfer problems on a smaller scale related to the development of solar energy conversion systems for space heating, as well as for electric power production. Heat transfer processes also affect the performance of propulsion systems, such as the internal combustion engine, gas turbine, and rocket engines. Heat transfer problems arise in the design of conventional space and water heating systems, in the design of incinerators and cryogenic storage equipment, in the cooling of electric equipment, in the design of refrigeration and air conditioning systems, and in many manufacturing processes. Heat transfer is also relevant to air and water pollution and strongly influences local and global climate.

## 1.2 Heat Transfer by Natural Convection

The natural convection phenomenon involves heat exchange between a fluid and an adjacent boundary where fluid motion occurs due to the density differences that result from energy exchange. The density differences gives rise to buoyancy effects due to the combined presence of a fluid density gradient and a body force that is proportional to density. In practice, the body force is usually gravitational, although it may be a centrifugal force in rotating fluid machinery or a coriolis force in atmospheric and oceanic rotational motions. There are also several ways in which a mass density gradient may rise in a fluid but for the most common situation is due to the presence of a temperature gradient.

Energy transfer by free convection occurs in many engineering applications. Heat transfer from hot radiators, refrigeration coils, transmission lines, electric transformers, electric heating elements and electronic equipment are typical examples.

## 1.3 Heat Transfer from Cavity

Heat transfer in cavities is receiving increasing attention because of the various applications in engineering; passive solar heating, energy conservation in building, solar concentrating receivers and electronic equipment.

Cavities, in general, are classified to be either closed and opened (where one side is open to surroundings) or square and rectangular. The flow and the heat transfer in the cavity depend to a great extent on the geometry of the cavity and its boundary conditions [1]. The geometrical parameters that affect the heat transfer between the cavity and the surroundings are the: the aspect ratio, opening ratio and the tilt angle. The boundary conditions may be basically of three types-(1) all the walls of the cavity are isothermal, (2) two of the walls are isothermal, and (3) one of the walls is isothermal or having constant heat flux and all other walls are adiabatic. Other parameters that affect the rate of heat transfer from the cavity to the surroundings are the Prandtl number (Pr) of the fluid in the cavity and the Grashof number (Gr) that characterizes the flow in the cavity.

## 1.4 Basis of the Present Work Selection

The present work is of the type 3 as mentioned above i.e., one of the walls is isothermal or having constant heat flux and other walls are adiabatic. The reason for choosing the same is the relative unavailability of data in the literature under this condition. Moreover, all the work that has been reported in the literature under type 3 was carried out for fully open cavities. Also a common feature for all the cavity studies is that the aperture was at the centre of the wall. None of studies have covered the case when the aperture is located off the centre of the wall.

The present experiment adds some information in the area of partially open rectangular cavity design where heat transfer by natural convection is the main mechanism of heat transfer. In the present work, three different geometrical arrangements for the opening are studied; high wall slit, low wall slit and uniform wall slots. For each arrangement, three different opening ratios are examined; i, e., at opening ratio = 0.25, 0.50, 0.75. For all these arrangements, the variation of the Nusselt number with the tilt angle are presented for tilt angles ranging from -90 deg to +90 deg with an increment of 15 deg. The results of these geometries will be very useful for many engineering application as mentioned in article 1.3.

## 1.5 Objectives of the Present Work

The specific objectives of the present research work are as follows:

(a) To record the temperature distribution in the cavity wall with different geometrical arrangement for determining average temperature for a given wall heat flux.

(b) To compare the variation of average wall temperature with cavity tilt angle at opening ratio= 0.25, 0.50, 0.75 for high wall slit, low wall slit and uniform wall slots.

(c) To compare the variation of Nusselt number with cavity tilt angle at opening ratio= 0.25, 0.50, 0.75 for different slit position.

(d) To compare the variation of Nusselt number with cavity tilt angle for high wall slit, low wall slit and uniform wall slots at each opening ratio.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 General

The literature on natural convection heat transfer is over-whelming and ever-growing. In recent years, with the availability of high-speed, large-capacity digital computers, great advances have been made in the analysis of very complicated natural convection heat transfer problem in great detail. Nevertheless, a large number of simpler engineering problems related to natural convection can be handled with the use of standard heat transfer correlations.

In the last several years, there is a very rapid increase in research in the field of natural convection. This increase intensity is due to enhanced concerns in the field of science and technology dealing with atmospheric motions, moreover in bodies of water, in quasi-solid bodies such as the earth, and in various devices and process equipment.

## 2.2 Natural Convection on a Vertical Plate

Heat transfer by free convection on a vertical plate has been the subject of numerous investigations. Here we present some of the recommended empirical correlations of free convection on a vertical wall in laminar and turbulent flow, for both uniform wall temperature (i.e., isothermal surface) and the uniform wall heat flux boundary conditions.

**Uniform wall temperature**

McAdams [2] correlated the average Nusselt number with an expression in the form

$$Nu_m = c\,(Gr_L . Pr)^n = c\,Ra^n_L \tag{2-1}$$

where L is the height of the vertical plate. The recommended values of the constant c and the exponent n are listed in Table 2-1. The physical properties are evaluated at $T_f = (T_w + T_\infty)/2$.

**Table 2-1 Constant c and the exponent n of Eq. (2.1)**

| Type of flow | Range of $Gr_L Pr$ | c | n |
|---|---|---|---|
| Laminar | $10^4$ to $10^9$ | 0.59 | $\frac{1}{4}$ |
| Turbulent | $10^9$ to $10^{13}$ | 0.10 | $\frac{1}{3}$ |

More recently, Churchill and Chu [3] proposed two equations for correlating free convection on a vertical plate under isothermal surface conditions. One expression, which applies to only laminar flow and holds all for values of the prandtl number, is given by

$$Nu_m = 0.68 + \frac{0.67 Ra_L^{1/4}}{\left[1 + (0.492/Pr)^{9/16}\right]^{4/9}} \qquad \text{for } 10^{-1} < Ra_L < 10^9 \tag{2-2}$$

The other expression, which applies to both laminar and turbulent flow, is given by

$$Nu_m^{1/2} = 0.825 + \frac{0.387 Ra_L^{1/6}}{\left[1 + (0.492/Pr)^{9/16}\right]^{8/27}} \qquad \text{for } 10^{-1} < Ra_L < 10^{12} \tag{2-3}$$

The physical properties are evaluated at $T_f = (T_w + T_\infty)/2$.

**Uniform wall heat flux**

Based on the experimental data of Vliet [4] for air and water and of Vliet and Liu [5] for water, the following correlations are proposed for the local Nusselt number under uniform wall heat flux:

$$Nu_x = 0.60(Gr_x^* Pr)^{1/5} \qquad \text{for } 10^5 < Gr^*_x Pr) < 10^{11} \text{ (laminar)} \tag{2-4}$$

$$Nu_x = 0.568(Gr_x^* Pr)^{0.22} \qquad \text{for } 2 * 10^{13} < Gr_x^* Pr < 10^{16} \text{ (turbulent)} \tag{2-5}$$

where the modified Grashof number $Gr_x^*$ is defined as

$$Gr_x^* = Gr_x Nu_x = \frac{g\beta(T_w - T_\infty)x^3}{\nu^2} \frac{q_w x}{T_w - T_\infty} = \frac{g\beta q_w x^4}{k\nu^2} \tag{2-6a}$$

and the local Nusselt number as

$$Nu_x = \frac{x h_x}{k} \tag{2-6b}$$

And $q_w$ is the constant wall heat flux.

## 2.3 Natural Convection on a Horizontal Plate

The average Nusselt number for free convection on a horizontal plate depends on whether the surface is facing up or down and whether the plate surface is warmer or cooler than the surrounding fluid. Again we consider the cases for uniform wall temperature and uniform wall heat flux separately.

**Uniform wall temperature**

Tha mean Nusselt number for free convection on a horizontal plate is correlated by McAdams [2] with an expression in the form

$$Nu_m = c\,(Gr.Pr)^n \qquad (2\text{-}7a)$$

where $Nu_m = \dfrac{Lh_m}{k}$ and $Gr_L = \dfrac{g\beta(T_w - T_\infty)L^3}{\nu^2}$ (2-7b)

The coefficient c and the exponent n are listed in Table 2-1.

**Table 2-2 Constant c and exponent n of Eq. (2.7a) for free convection on a horizontal plate at uniform temperature**

| Orientation of plate | Range of $Gr_L Pr$ | c | n | Flow regime |
|---|---|---|---|---|
| Hot surface facing up or cold surface facing down | $10^5$ to $2 \times 10^7$ | 0.54 | $\frac{1}{4}$ | Laminar |
| | $2 \times 10^7$ to $3 \times 10^{10}$ | 0.14 | $\frac{1}{3}$ | Turbulent |
| Hot surface facing down or cold surface facing up | $3 \times 10^5$ to $3 \times 10^{10}$ | 0.27 | $\frac{1}{4}$ | Laminar |

**Uniform wall heat flux**

Free convection under uniform wall heat flux has been studied extensively for an electrically heated plate in vertical, horizontal, and inclined positions.

For horizontal plate with the heated surface facing upward:

$$Nu_m = 0.13(Gr_L.Pr)^{1/3} \qquad \text{for } Gr_L.Pr < 2 * 10^8 \qquad (2\text{-}8)$$

$$Num = 0.16(Gr_L.Pr)^{1/3} \qquad \text{for } 5*10^8 < Gr_L.Pr < 10^{11} \qquad (2\text{-}9)$$

For the horizontal plate with the heated surface facing downward:

$$Nu_m = 0.58(Gr_L.Pr)^{1/5} \qquad \text{for } 10^6 < Gr_L.Pr < 10^{11} \qquad (2\text{-}10)$$

The physical properties in Eqs. (2-8) to (2-10) are to be evaluated at a mean temperature, defined as

$$T_m = T_w - 0.25(T_w - T_\infty) \qquad (2\text{-}11)$$

and the volume expansion coefficient $\beta$ at $(T_w + T_\infty)/2$.

## 2.4 Natural Convection on an Inclined Plate

Free convection on inclined surfaces has been studied by several investigators. The orientation of the inclined surface, whether the surface is facing upward or downward, is also a factor that affects the Nusselt number. To make a distinction of the surface, following Fujii and Imura [6], we designate the sign of the angle $\theta$ that the surface makes with the vertical as follows:

1. The angle $\theta$ is considered negative if the hot surface is facing up, as illustrated in Fig.2-2a.

2. The angle $\theta$ is considered positive if the hot surface is facing down, as illustrated in Fig.2-2c.

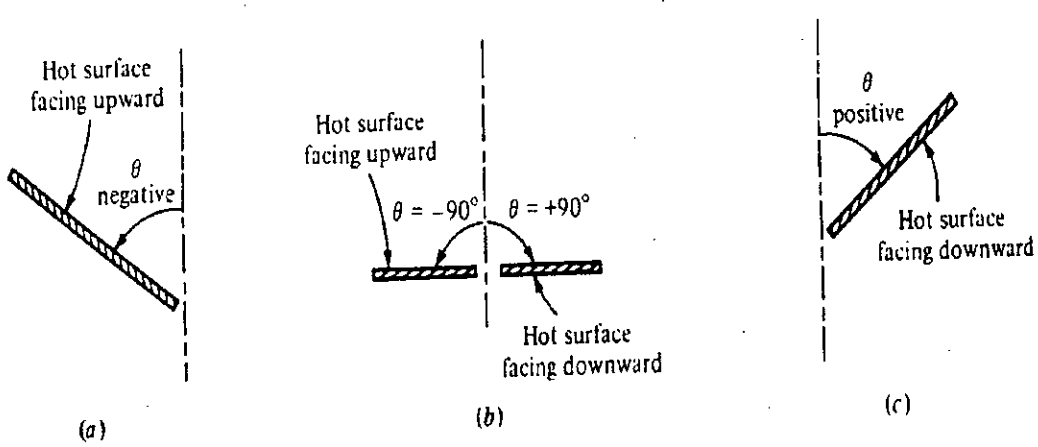



**Figure 2-2** The concept of positive and negative inclination angles from the vertical to define the orientation of the hot surface.

Figure 2-2b illustrates the limiting cases of $\theta \rightarrow -90^0$, the horizontal plate with hot surface facing upward, and $\theta \rightarrow +90^0$, the horizontal plate with hot surface facing downward.

**Uniform wall heat flux**

Here we represent the heat transfer correlations based on the extensive experimental investigations of Fuji and Imura [6] for free convection from an inclined plate subjected to approximately uniform wall flux to water.

For an inclined plate with the heated surface facing downward:

$$Nu_m = 0.56(Gr_L.Pr\cos\theta)^{1/4} \quad \text{for } +\theta < 88^0,\ 10^5 < Gr_L.Pr < 10^{11} \qquad (2\text{-}12)$$

For an inclined plate with the heated surface facing upward:

$$Nu_m = 0.145[(Gr_L.Pr)^{1/3} - (Gr_c.Pr)^{1/3}] + 0.56(Gr_c.Pr\cos\theta)^{1/4} \qquad (2\text{-}13)$$

$$\text{for } Gr_L.Pr < 10^{11},\ Gr_L > Gr_c, \text{ and } -15^0 < \theta < -75^0.$$

In Eqs. (2-12) and (2-13), all physical properties are evaluated at the mean temperature

$$T_m = T_w - 0.25\ (T_w - T_\infty)$$

and $\beta$ is evaluated at $T_\infty + 0.25(T_w - T_\infty)$.

## 2.5 Natural Convection from Cavity

Many investigations have been carried out for the heat transfer in cavities by natural convection. Experimental as well as numerical works have been reported for cavities (partially/fully open or close) with various fluids.

### 2.5.1 Open Cavity

Natural convection in open cavities is getting more attention due to the importance of such geometry in solar thermal receiver systems, fire research, electronic cooling, and energy-saving houshold refrigeration etc.

One of the early works that was reported for heat transfer from open cavities is that of Le Quere et al [7]. In this work a fully open square cavity with isothermal wall was studied numerically. Tilt angles of 0, 20, and 45 deg were considered. The effect of changing the aspect ratio from 0.5 to 2 was studied for cavities with tilt angle 0 deg. The authors found that the flow field within the cavity and in the aperture plane is determined mainly by local heat transfer effects. They also showed that changes in cavity orientation produce striking variations in cavity flow pattern due to the interchanging heat transfer roles of the walls as the cavity is inclined. Thermal losses from the cavity decreased as tilt angle increased due to the stable stratification of flow.

V. Sernas and I. Kyriakides [8] investigated experimentally two-dimensional natural convection in an open air cavity (Fig. 2-3) of aspect ratio 1.0 at a Grashof number of $10^7$. The heat transfer rates along the inner hot vertical wall and ceiling were measured with a Wollaston prism schlieren interferometer. Velocity profiles near the hot inner vertical wall and the ceiling were measured with a laser Doppler anemometer. Streamline patterns within the open cavity were visualized by injecting cigarette smoke into the cavity. The measured local heat flux distribution curve along the inner hot vertical wall, except in the region close to the upper corner, agreed well with the distribution curve predicted for an isothermal vertical plate at the same Grashof number. The vertical velocity profiles along the inner hot vertical wall of the open cavity agreed well with the profiles predicted for an isothermal vertical flat plate suspended in an infinite medium.

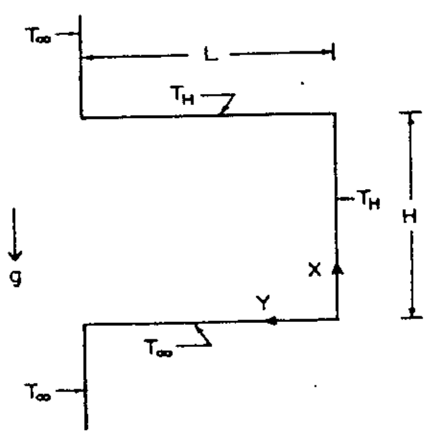



**Figure 2-3** Schematic view of open cavity (investigated by V. Sernas and I. Kyriakides).

Chan and Tien [9] reported numerical and experimental results of flow and heat transfer in a side-facing open cavity of aspect ratio 0.143 and Rayleigh numbers ranging from $1 \times 10^6$ to $1 \times 10^7$ using water as a working fluid. It is found that the heat transfer is conduction dominated for $Ra = 1 \times 10^3$ and the rate of heat transfer approaches that of free convection from a flat plate for $Ra > 1 \times 10^7$.

Hess and Henze [10] conducted experimental work on a side-facing open cavity with apertures and for an aspect ratio of the order of unity. They intended to model solar energy concentrating receivers. The Rayleigh numbers investigated were $3 \times 10^3$ to $2 \times 10^{11}$. It is found that the aperture has little effect on the rate of heat transfer compared with results of cavities without apertures.

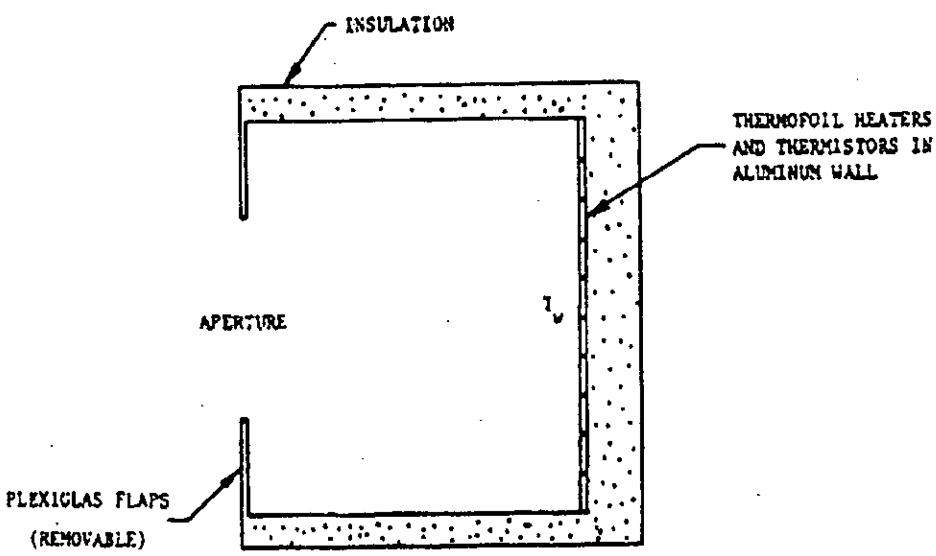



**Figure 2-4** Schematic presentation of cavity (investigated by Hess and Henze).

Skok et al. [11] reported experimental and numerical results for a side facing cavity, where the walls of the cavity are kept at temperature lower than the environment. Numerical calculations were performed for Ra from $1 \times 10^3$ to $1 \times 10^7$, and experiments were performed for Ra from $3.5 \times 10^6$ to $1.2 \times 10^9$. Average Nusselt number was correlated for each wall of the cavity.

A. A. Mohamad [12] investigated natural convection from open cavities or heated plates attached with vertical strips. The bottom of the cavity is heated, and the vertical walls are assumed adiabatic. The focus of the work is to examine the flow and heat transfer from uncovered solar collectors attached with rows of the vertical strips. In clear and dry climates the uncovered solar collector can be used as a radiative cooler at night where the temperature of the sky is much below 0°. Adding strips to the collector plates reduces convection and wind effects. If the strip spacing is 1 cm, then Ra becomes of the order of $1 \times 10^4$. Also, such arrangements simulate natural convection from electronic chips, which are commonly placed between two boards. Calculations are carried out for Ra = $1 \times 10^3$ to $1 \times 10^7$ and for aspect ratio of 0.5, 1, and 2. The Prandtl number is set to 0.7(air) for all calculations. Inclinations angle varied in the range of 10° to 90°. It was found that the inclination angle does not have a significant effect on the rate of heat transfer from the heated bottom plate but have a substantial effect on the local Nusselt number. Flow becomes unstable as aspect ratio and/or Rayleigh number increases.

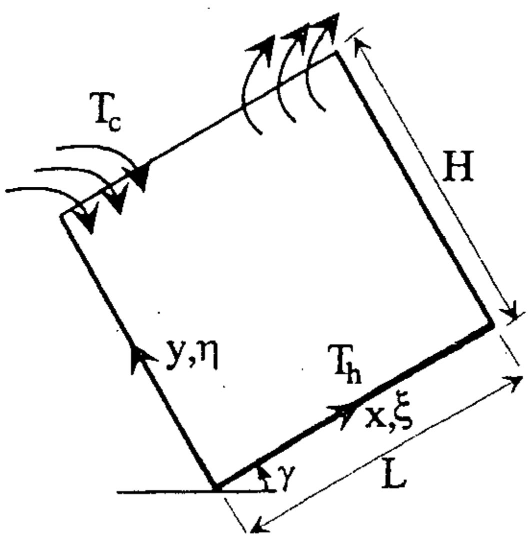



**Figure 2-5** Schematic diagrams of open cavity and the coordinate system (investigated by A. A. Mohamad).

E. Bilgen and H. Oztop [13] investigated inclined partially open square cavities, which are formed by adiabatic walls and a partial opening. The surface of the wall inside the cavity facing the partial opening is isothermal. Steady state heat transfer by laminar natural convection in a two dimensional partially open cavity is studied by numerically solving equations of mass, momentum and energy. Streamlines and isotherms are produced; heat and mass transfer is calculated. A parametric study is carried out using following parameters; Rayleigh number from $10^3$ to $10^6$, dimensionless aperture size from 0.25 to 0.75, aperture position is high, centre and low and inclination of opening from $0^0$ (facing upward) to $120^0$ (facing downward).

It is found that the volume flow rate and Nusselt number are an increasing function of Rayleigh number, aperture size and generally aperture position. Other parameters being constant, Nusselt number is a non-linear function of the inclination angle. Depending on the application, heat transfer can be maximized or minimized by selecting appropriate parameters, namely aperture size, aperture position and inclination angle at a given operation Rayleigh number.

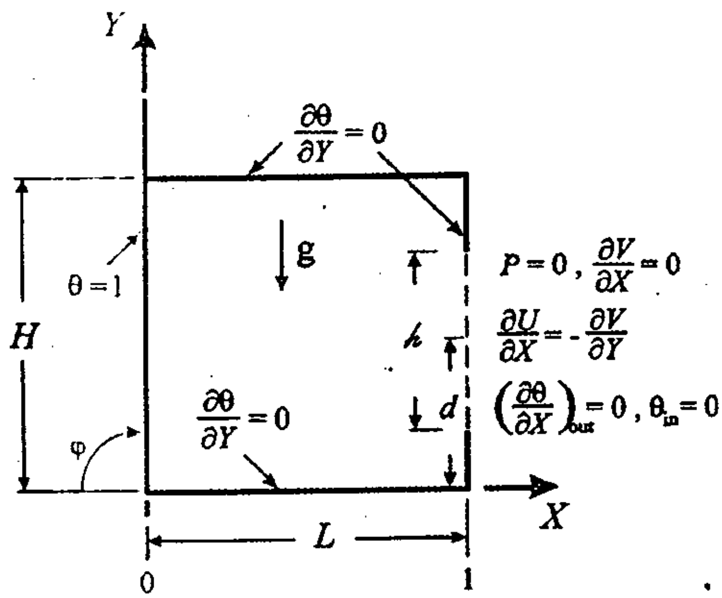



**Figure 2-6** Schematic of the open cavity system, the coordinate system and boundary conditions (investigated by E. Bilgen and H. Oztop).

Several other investigations [14], [15], [16] studied heat transfer by natural convection from open cavities. Some of these studies focused on the effect of varying the aspect ratio and/or the opening ratio of the cavity on the flow pattern and on the heat transfer from the cavity. Other studies investigated the effect of varying the tilt angle of the cavity and/or the conditions of its walls on heat transfer.

### 2.5.2 Closed Cavity

Natural convection in closed cavities has received considerable attention experimentally and numerically. Heating a cavity from below and cooling it from above produces thermally unstable stratified flow. Convection is initiated if the rate of the heating is increased and exceeds threshold value. Mechanism of flow development and rate of heat transfer are well understood for this type of convection, called Rayleigh-Benerd convection. Also, extensive literature is available on the flow and the heat transfer in differentially heated cavities, for a Prandtl number of the order of 1. The effects of aspect ratio, Rayleigh number, and Prandtl number are addressed in the literature.

## CHAPTER THREE

# EXPERIMENTAL DESIGN

## 3.1 General

This chapter includes the experimental aspects of the investigation, describes the apparatus used and the test procedure. Figure 3-1 illustrates the main features of the experimental setup that ensure the structure of the work. Figure-3-2 illustrates the cross sectional view of the cavity from which the wall position, heater position, thermocouples position and the insulation system can be observed. Figure-3-3 and figure 3-4 illustrates the geometry of the cavity that indicates the tilt angle, slit position and the opening ratios. Figure 3-5 shows the actual view of the experimental set up that ensures the overall idea of the work. For the test record, the cavity was equipped with a digital voltmeter, an ammeter, several thermocouples, wire selector switches and the digital temperature meter.

## 3.2 Experimental Setup

The setup consists of a rectangular cavity with H =17.78 cm, L =91.44 cm and B =12.70 cm. The cavity is mounted on a stand and supported by two arms which are tiltable. The arms and stand are designed to minimize the disturbance to the air flow and to ensure good physical stability. The tiltable frame can vary the tilt angle from –90 deg to +90 deg from the vertical. The cavity can be rotated along its longitudinal axis by loosening the end knobs. The angle of tilt ($\alpha$) is measured with respect to the vertical axis (Fig. 3-3) clockwise negative and can be read from a protractor.

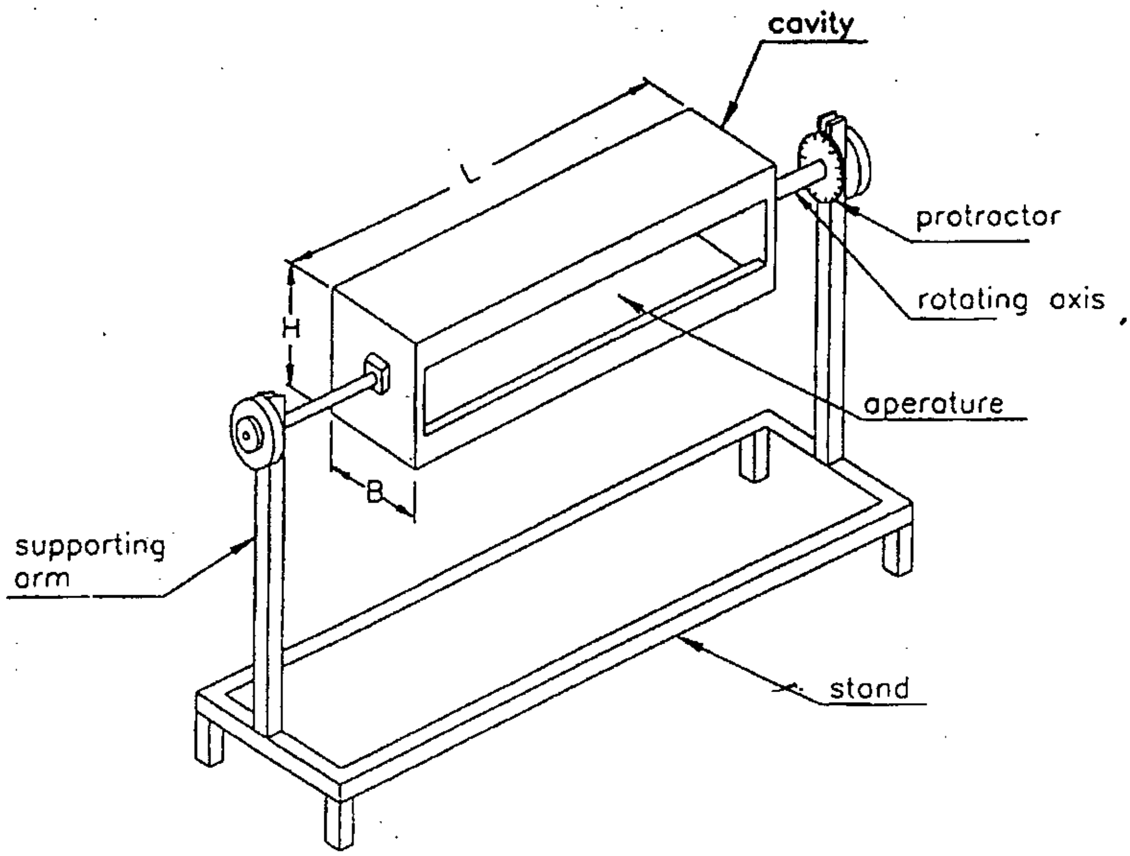
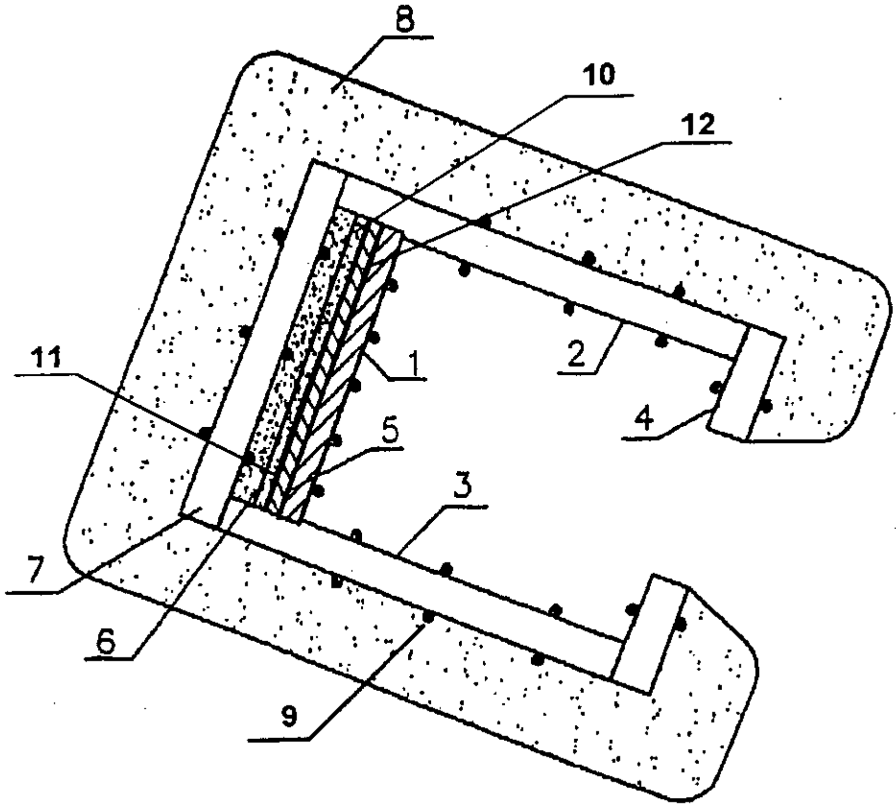



**Figure 3-1** Main feature of the experimental setup

Figure 3-2 shows a cross sectional view of the cavity. The side of the cavity which faces the aperture (heated surface) is made of an aluminum plate (17.78 cm X 91.44 cm and 0.5 cm thick) and the other sides are made of packing-wood with stainless steel sheet covers on them. The plate is heated electrically by heater coil at constant heat flux. A thick piece of asbestos sheet insulation is pressed against the heater coil to ensure that the heater coil is in good contact with aluminum plate. All sides of the cavity including the plate are insulated with glass wool to minimize heat loss from the cavity i.e. all the walls of the cavity are adiabatic except the wall facing the cavity opening.




1. aluminum plate
2. packing-wood wall
3. packing-wood wall
4. packing-wood wall
5. heating coil
6. plexiglas
7. packing-wood back wall
8. glasswool insulation
9. thermocouple junction
10. asbestos sheet
11. mica sheet
12. mica sheet

**Figure 3-2** Cross-sectional view of the cavity with thermocouple locations

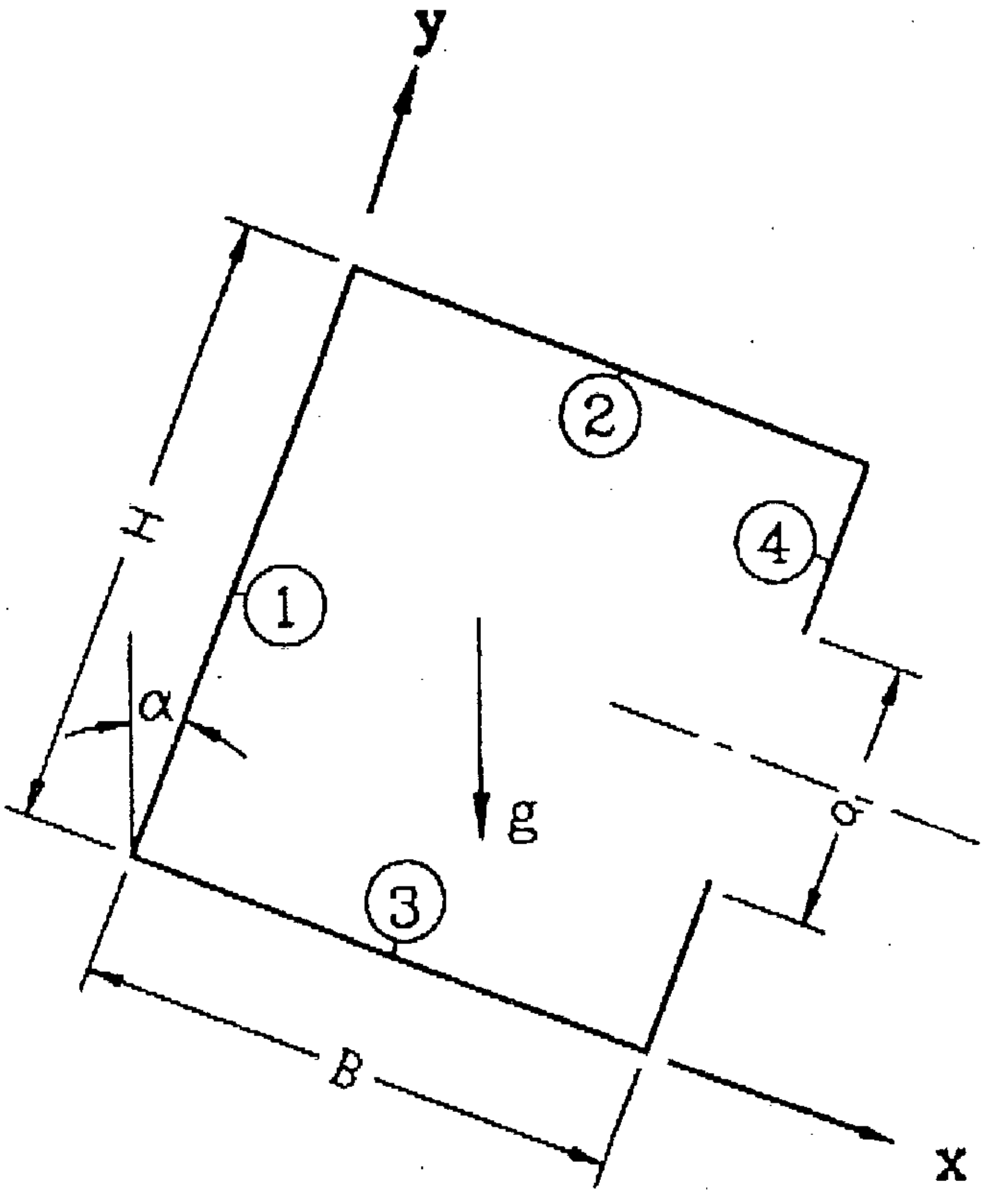



Figure 3-3 Geometry of a partially open cavity

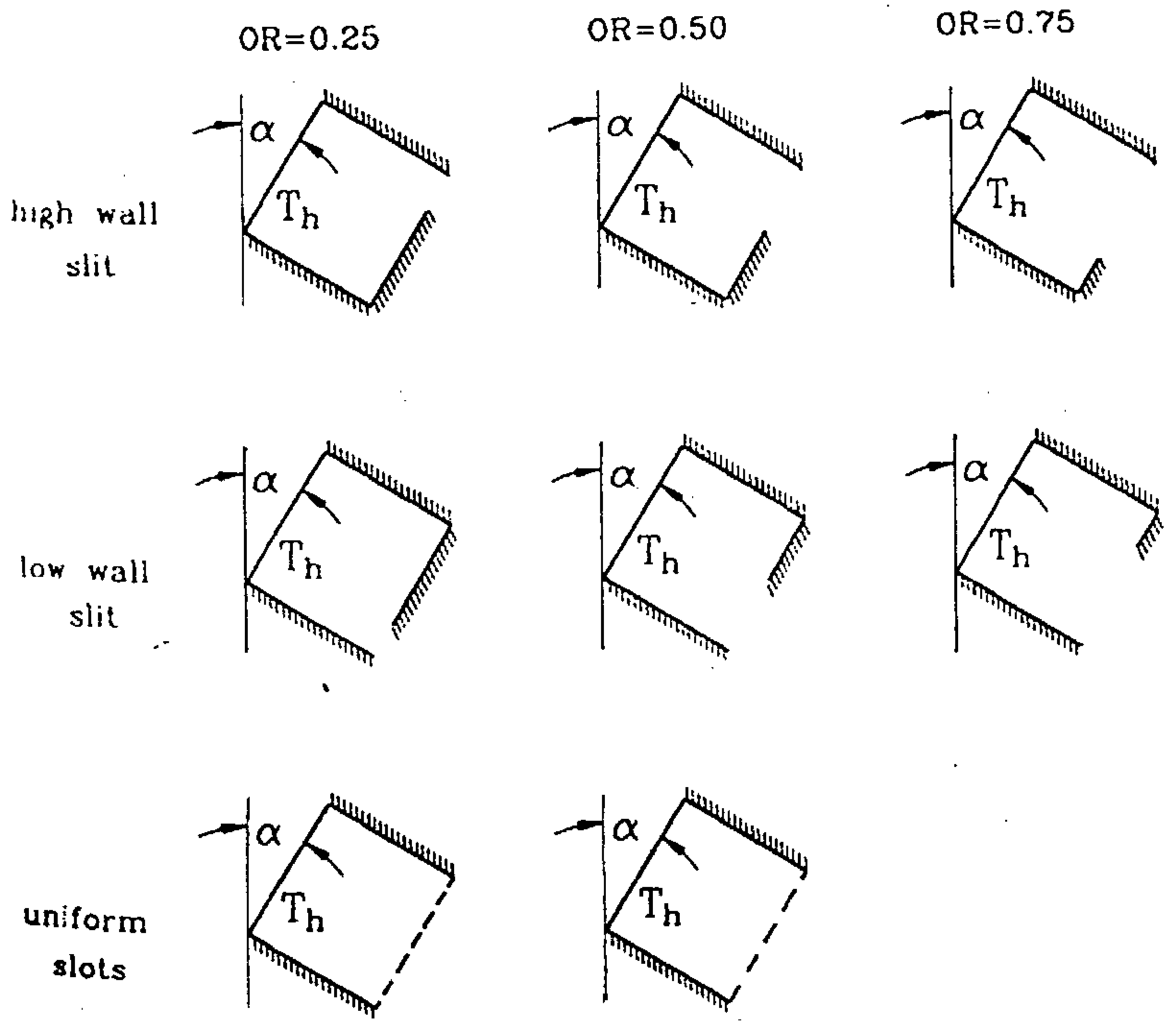



**Figure 3-4** Geometries of cavities that are considered in the present work

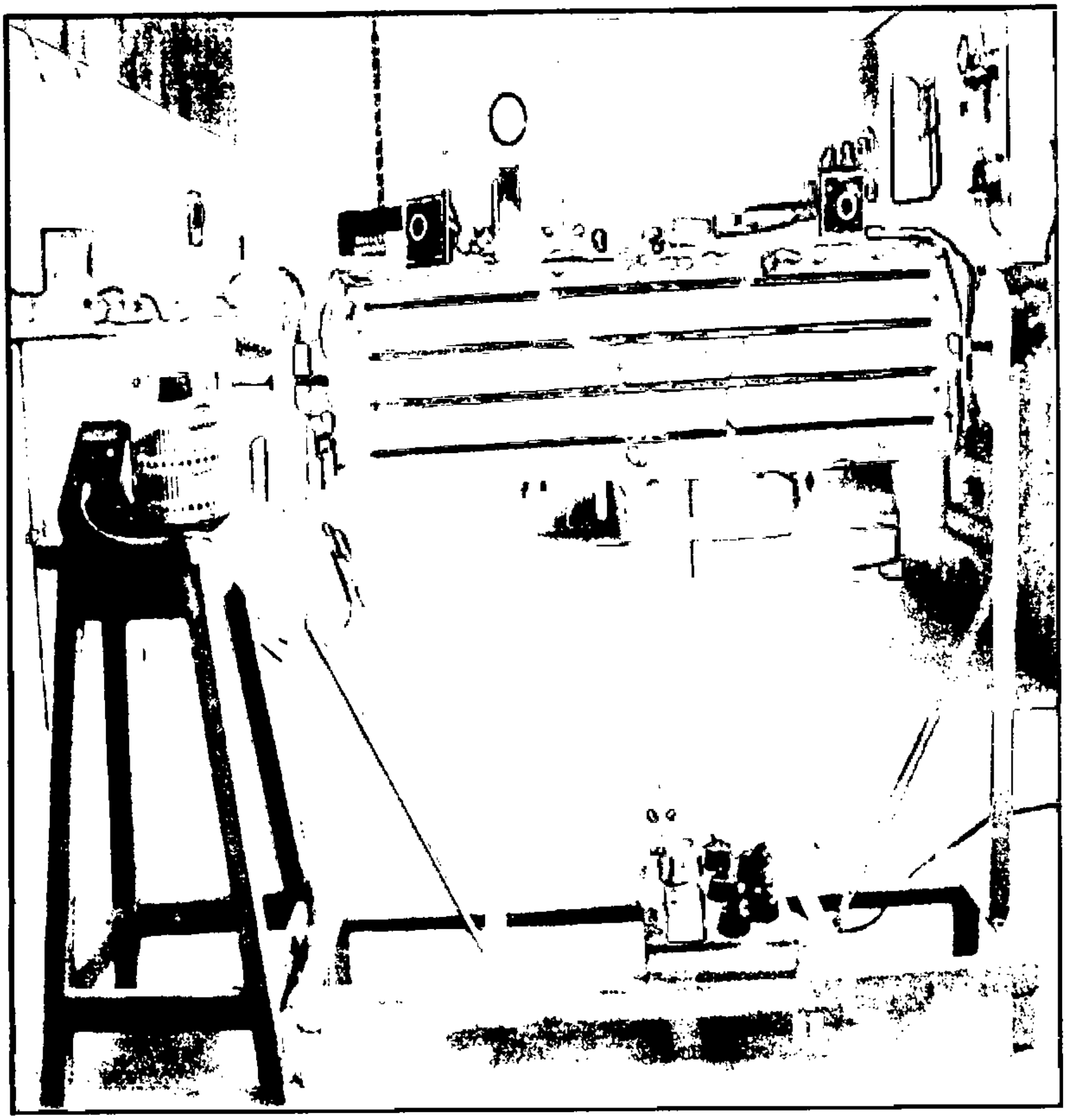


Figure 3-5 Actual view of the experimental setup

## 3.3 Experimental Procedure

The T-type (Copper-Constantan) thermocouples wires are used for temperature measurement, because the used digital temperature meter supports the T-type thermocouple wires. All thermocouples are connected to digital temperature meter through connector switches. The thermocouples wires and the temperature meter are calibrated to ensure good result. A calibration curve is drawn from the actual and the measured temperature. The actual temperature is measures by thermometer and the measured temperature is measured by digital temperature meter. The calibration curve may be seen from fig. A-1.

All walls of the cavity are adiabatic except the wall facing the cavity opening i.e., the aluminum plate (heated wall) is heated at a constant heat flux. The heat input to the heater is controlled by an electric circuit composed of a 220V*0.5A power supply and a voltage regulator. The voltage and the current applied to the heater are measured continuously by a calibrated digital voltmeter and a calibrated ammeter with accuracy of 0.025 percent. The power supplied to the coils is calculated from the voltage, the current and the angle $\varphi$ between them.

The surface temperature of the aluminum plate (1, as shown in fig.3.3) is monitored using five thermocouples, equally spaced across the width of the plate. In addition, three surface thermocouples are fixed on the inside and outside of walls 2 and 3 (fig. 3.3). The number of thermocouples fixed on each side of the wall 4 (fig. 3.3) was 6, 4, or 2 depending on the opening ratio value of 0.25, 0.50 and 0.75 respectively. Also, to estimate the heat loss from behind the heater, thermocouples are installed on both faces of the packing-wood wall at the back (7, as shown in fig. 3.2).The ambient temperature outside the opening of the cavity is measured by a separate thermocouple.

Tests were carried out for three different opening ratios of 0.25, 0.50 and 0.75. Three different geometrical arrangements for the openings were investigated: (1) high wall slit, (2) low wall slit and (3) uniform wall slots. For a given opening ratio the cavity is rotated by an increment of 15 deg between -90 deg to +90 deg around the vertical axis. Temperature at each of the thermocouple points was recorded for each test run after steady state condition. In most cases steady state was achieved within after one hour. However when the aperture is facing upward it is found that a waiting period of two hour is necessary to reach steady state conditions. Steady state condition for each run is considered to be achieved when the differences in the wall temperatures did not change by more than $0.1^0$C within a 15 minute period.

## CHAPTER FOUR

# Heat Transfer Calculations

The flow and the heat transfer in the cavity depend to a great extent on the geometry of the cavity and its boundary conditions. The geometrical parameters that affect the heat transfer between the cavity and the surroundings are: the aspect ratio, the opening ratio and the tilt angle. Other parameters that affect the rate of heat transfer from the cavity to the surroundings are the Prandtl number (Pr) of the fluid in the cavity and the Grashof number (Gr) that characterizes the flow in the cavity.

### 4.1 Aspect Ratio

It is the ratio of height of the cavity to the width of the cavity. Aspect Ratio (AR) may be defined as

$$\mathrm{AR} = \frac{H}{B} \qquad (4\text{-}1)$$

Where H is the height of the cavity and B is the width of the cavity as shown in fig. 3-3.

### 4.2 Opening Ratio

It is the ratio of height of the aperture to the height of the cavity. Opening Ratio (OR) may be defined as

$$\mathrm{OR} = \frac{a}{H} \qquad (4\text{-}2)$$

Where $a$ is the height of the aperture (opening) and H is the height of the cavity as shown in fig.3-3.

## 4.3 Prandtl Number

It represents the relative importance of momentum and energy transport by the diffusion process. Prandtl Number (Pr) is defined as

$$\mathrm{Pr} = \frac{C_p \mu}{K} = \frac{\mu \rho}{K/(\rho C_p)} = \frac{\upsilon}{\alpha} \tag{4-3}$$

## 4.4 Grashof Number

It represents the ratio of the buoyancy force to the viscous force acting in the fluid. Grashof number (Gr) is defined as

$$\mathrm{Gr} = \frac{g\beta L^3 (T_w - T_\infty)}{\upsilon^2} \tag{4-4}$$

We recall that in forced convection, the Reynolds number represents the ratio of the inertia to viscous forces acting on the fluid. Therefore, the Grashof number in free convection plays the same role as the Reynolds number in forced convection.

## 4.5 Nusselt Number

Nusselt number may be interpreted as the ratio of heat transfer by convection to conduction across the fluid layer. Nusselt number (Nu) may be defined as

$$\mathrm{Nu} = \frac{hB}{k} = \frac{h\Delta T}{k(\Delta T / B)} \tag{4-5}$$

Based on this interpretation, the value of the Nusselt number equal to unity implies that there is no convection- the heat transfer is by pure conduction. A large value of the Nusselt number implies enhanced heat transfer by convection.

In terms of the local heat transfer coefficient h, Eq. (4-5) is rewritten in the following form:

$$\mathrm{Nu} = \frac{1}{k}\frac{B}{H}\int_0^H h\,dy \tag{4-6}$$

where y and h are defined in Fig. 3-3. When wall 1 is heated at constant heat flux $q''$, the local heat transfer coefficient is given by the equation

$$\mathrm{h} = \frac{\mathrm{q}}{(\mathrm{T_p} - \mathrm{T_\infty})} \tag{4-7}$$

where $T_p$ is the local temperature of the wall. Dividing the wall into five equal sections, Eqs. (4-6) and (4-7) are combined to give

$$\mathrm{Nu} = \frac{B}{5k}\sum_{i=1}^{5}\frac{q}{(T_{pi} - T_\infty)} \tag{4-8}$$

where i is the order of the various section on the heated plate.

To calculate q, an energy balance for the heated plate gives

$$\mathrm{VI} = \frac{HL}{0.83}\,(\mathrm{q} + \mathrm{q_c} + \mathrm{q_r}) \tag{4-9}$$

where I and V are the current and voltage to the heating elements. $q_c$ is the heat lost through all walls of the cavity to the ambient, and $q_r$ is the heat transferred by radiation from the hot wall to the surroundings as seen through the aperture. Using Eq. (4-8), Eq. (4-9) becomes

$$\text{Nu} = \frac{B}{5k}\sum_{i=1}^{5}\left\{\left(\frac{0.83VI}{HL} - q_c - q_r\right)/(T_{pi} - T_\infty)\right\} \tag{4-10}$$

The radiation heat loss $q_r$ from the hot wall is estimated as follows:

$$q_r = \sigma\ [(T_p + 273)^4 - (T_\infty + 273)^4] / \left(\frac{1-\varepsilon}{\varepsilon} + \frac{1}{F_{pa}}\right) \tag{4-11}$$

where $T_p$ is the average temperature of the hot wall, $\epsilon$ is its emissivity and Fpa is the configuration factor between the plate and the aperture. In Eq. (4.11) it is assumed that the surrounding is a black body at temperature $T_\infty$.

The conduction heat loss $q_c$ in Eq. (4-10) is the sum of the heat loss through walls 2, 3, 4 and 5 (Fig. 3-2). This is expressed as follows:

$$q_c = \frac{k_w}{B}\sum_{j=2}^{3}\int_{o}^{s_j}(T_{j,i} - T_{j,o})\frac{ds}{t_j} + \frac{k_w}{H}\sum_{j=4}\int_{0}^{s_j}(T_{j,i} - T_{j,o})\frac{ds}{t_j} + \frac{k_w}{H}\sum_{j=5}\int_{0}^{s_j}(T_{j,i} - T_{j,o})\frac{ds}{t_j}$$

(4-12)

where j is the wall identification number, $k_w$ is the thermal conductivity of the walls, t is the thickness of the walls, s is the distance along the walls, and $T_{j,i}$ and $T_{j,o}$ are the local temperatures on the inner and outer surfaces of the j wall, respectively.

# CHAPTER FIVE

# RESULTS AND DISCUSSIONS

## 5.1 Presentation of Results

The experimental work was performed to study the effect of the aperture geometry of a tilted, partially open cavity on the rate of heat transfer between the cavity and the surrounding air. For each run, the heat transfer coefficient was obtained for tilt angles ranging between -90 to +90 deg at increments of 15 deg, with the aspect ratio of the cavity taken to be 1.4. In all experiments, the heated wall was almost isothermal under constant heat flux condition. The average temperature of the heated wall was found to be dependent on the tilt angle of the cavity and the dimension and geometry of the aperture of the cavity. Figures 5-1 to 5-9 show the variation of Nu and average wall temperature for various aperture geometry and at different values of opening ratio (OR).

### 5.1.1 Effect of tilt angle on heat transfer

For a given arrangement and at a certain value of OR, the effect of changing the tilt angle ($\alpha$) on heat transfer depends on the range over which $\alpha$ is changed. Two zones are identified: $\alpha < 0$ deg and $\alpha > 0$ deg. The case with $\alpha < 0$ deg represents all cavities with heat flow in the upward direction. Here, heat is transferred in the same direction with the buoyancy force. Within this zone a change in $\alpha$ has a negligible effect on Nu. The case with $\alpha > 0$ deg, however, behaves differently. This is the case when heat is transferred in a downward direction, i.e., in the opposite direction to the buoyancy force. Here, as $\alpha$ is increased, the buoyancy component that opposes the flow of heat increases and thus convection is suppressed. An increase in the tilt angle beyond 0 deg causes the development of a stratified zone in the low wall slit cavity, as shown in fig. 5.22. This causes the decrease in the value of Nu in both geometries. As the cavity reaches a tilt angle of 90 deg the air within the cavity becomes fully stratified and heat transfer in this case takes place by conduction mainly, since convection is suppressed

### 5.1.2 Effect of slit position on heat transfer

For this purpose, consider cases of the high wall slit and the low wall slit with various tilt angles as shown in Fig.5-22. In these cavities heat is transferred by the buoyancy driven flow. Starting with a tilt angle equal to -90 deg, both the high wall slit and low wall slit have the same flow pattern as shown by the temperature distribution in fig. 5-1, 5-3, and 5-5, thus resulting in the value of Nu as shown in figs. 5-7, 5-8, and 5-9. As the tilt angle increases to approach zero degree (i.e., vertical cavity), a stagnant zone of air starts to form in the low wall slit cavity as a result of stratification. This leads to a situation where only a fraction of the surface area of the heated wall is used to drive the flow through the cavity (Fig. 5-22). The conclusion is that the low wall slit cavity has a lower value of Nu than that of high wall slit cavity. When the tilt angle reaches zero, i.e., the cavity becomes vertical, a sizable zone in the low wall slit cavity becomes stratified, thus causing an appreciable drop in the value of Nu in comparison with that given by the high wall slit cavity.

### 5.1.3 Effect of opening ratio (OR) on heat transfer

The opening ratio plays an important role in cavities for heat transfer. It is related to the height of the slit. As the height of the slit increases the OR will increase. The effect of varying the opening ratio may be seen from fig. 5-10 to 5-12. Generally increase of the opening ratio (OR) of the cavities leads to a increase in the value of Nu regardless of the values of tilt angle ($\alpha$). Because, decrease of opening ratio means a reduction of the flow area and the corresponding heat transfer, hence, the temperature of the cavity increases.

## 5.2 Variation of average wall temperature and Nusselt number with cavity tilt angle for different slit position.

Figure 5-1 and 5-2 presents the results for a cavity with a high wall slit. The data are presented for opening ratios of 0.25, 0.5, and 0.75. As shown in figure, the opening ratio of 0.75 gives the minimum values of the average wall temperature and the maximum values of Nusselt number for all the tilt angles. Because the cavities get more flow area for opening ratio 0.75 than the opening ratios 0.25 and 0.50 to transfer heat from the cavity. Not much difference is seen between OR of 0.75 and 0.50 because the difference is within the uncertainty of the measurements. For OR = 0.25, the values of Nusselt number show an appreciable decrease and increase in average temperature in comparison to those of OR = 0.50 or OR = 0.75 for tilt angle less than 30. Within this zone heat is transferred in the same direction with the buoyancy force, hence a change in tilt angle, $\alpha$ has a negligible effect of Nu.

Figure 5-3 and 5-4 presents the results for the low wall slit. The trend of the variation of the wall average temperature and the average Nusselt number with the tilt angle of the cavity and the opening ratio is not the same as that for the case of the high wall slit. Because high wall slit and low wall slit differ for the dispatch of heat from the cavity. For low wall slit, the fluid flow is affected and can not transfer heat from the cavity, when $-75 \leq \alpha \leq 90$. In this situation, some heat is trapped in the cavity. Hence, cavity of low wall slit has the lowest value of Nusselt number than the high wall slit.

Figure 5-5 and 5-6 presents the data for uniformly distributed wall slits. The data is presented for opening ratios of 0.25 and 0.50. For the uniformly distributed wall slit, fluid flow occurs through top, centre and bottom of the wall. The rate of heat transfer depends on the opening ratio at a given value of tilt angle. Heat transfer for an opening ratio of 0.50 gives values of Nusselt number greater than those for opening ratio of 0.25 for all the tilt angles. Since opening ratio 0.50 gets more space than the opening ratio 0.25 to transfer heat from the cavity, hence more heat transfer for the case of opening ratio 0.50.

## 5.3 Variation of average wall temperature and Nusselt number with cavity tilt angle at each opening ratio.

Figure 5-7 shows the variation of Nusselt number with the cavity tilt angle for opening ratio of 0.25 and for all three arrangements; high, low, and uniformly distributed wall slits. It is clear from the results in the figure that no trend can be predicted for the effect of the opening geometry on the rate of heat transfer at $\alpha < -60$ deg. In that case heat transfer process maintain similar pattern, so no trend can be predicted. At $\alpha \geq -60$ deg, it is clear that cavities with low wall slit give the least amount of heat transfer in comparison with other cases. This is the case where heat transfer process is suppressed. One finds a sudden change in the trend of variation of Nu with $\alpha$ for tilt angles between -30 deg to -60 deg. This sudden change in the value of Nu is more pronounced in the high wall slit than in the low wall slit. This is may be related to dependence of the geometry of the stratified zone, the point of flow separation on the heated surface on the value of the tilt angle and the position and the size of the opening of the cavity.

Figure 5-8 presents similar results when opening ratio of 0.50 is used. It is clear here that the high wall slit and uniformly distributed wall slots have the highest values of Nusselt number for $\alpha \leq 0$ deg. The low wall slit arrangement gives the lowest values of Nusselt number for all tilt angles. This is the case where heat transfer process by convection is suppressed compared to the high and uniform wall slits.

Figure 5-9 shows the variation of Nusselt number with the cavity tilt angle for the high and low wall slits of opening ratio of 0.75. The high wall slit always has a higher value of Nusselt number than that of the low wall slit for all tilt angles. Since convection flow is more in the case of high wall slit, the heat transfer from the cavity is more in this case than those of low wall slit cavity.

## 5.4 Variation of Nusselt number with opening ratio for different slit position.

Figure 5-10 shows the variation of Nusselt number with opening ratio for low wall slit. This figure indicates that Nusselt number increases with the increase of opening ratio. Increasing of opening ratio means heat transfer flow area increases, hence, the convection process is more which ensure the increase of Nusselt number.This figure also indicates that the Nusselt number decreases with the increase of tilt angle for all the cases.

Figure 5-11 shows the variation of Nusselt number with opening ratio for high wall slit. This figure also ensure that the Nusselt number increases with the increase of opening ratio and decreases with the increase of tilt angle for all the cases.

Figure 5-12 shows the variation of Nusselt number with opening ratio for uniform wall slot. From this figure it is clear that Nusselt number increases with the increase of opening ratio and decreases with the increase of tilt angle.

## 5.5 Variation of Nusselt number with slit position for different opening ratio.

Figure 5-13 to 5-15 show the variation of Nusselt number with slit position for opening ratios of 0.25, 0.50 and 0.75. It is clear from these figures that for almost all the cases low wall slit have the lowest Nusselt number, the uniform wall slot have the highest Nusselt number and the high wall slit have more Nu than the low wall slit and less than the uniform wall slot.

## 5.6 Variation of Nusselt number with Grashof number for different slit positions.

Figure 5-16 to 5-18 show the variation of Nusselt number with Grashof number for low wall, high wall and uniform wall slots. These figures indicate that Nusselt number decreases with the increase of Grashof number. As the cavity was rotated from -90° position to +90° position, the Grashof number continuously increased and thereby characterized the flow in the cavity.

## 5.7 Variation of Nusselt number with Rayleigh number for different slit positions.

Figure 5-19 to 5-21 show the variation of Nusselt number with Rayleigh number for low wall, high wall and uniform wall slots. These figures ensure that the Nusselt number decreases with the increase of Rayleigh number. Since the Rayleigh number is the product of Grashof number and prandtl number, and Prandtl number is almost constant hence, these graphs have the same nature as the graphs shown in figure 5-16 to 5-18.

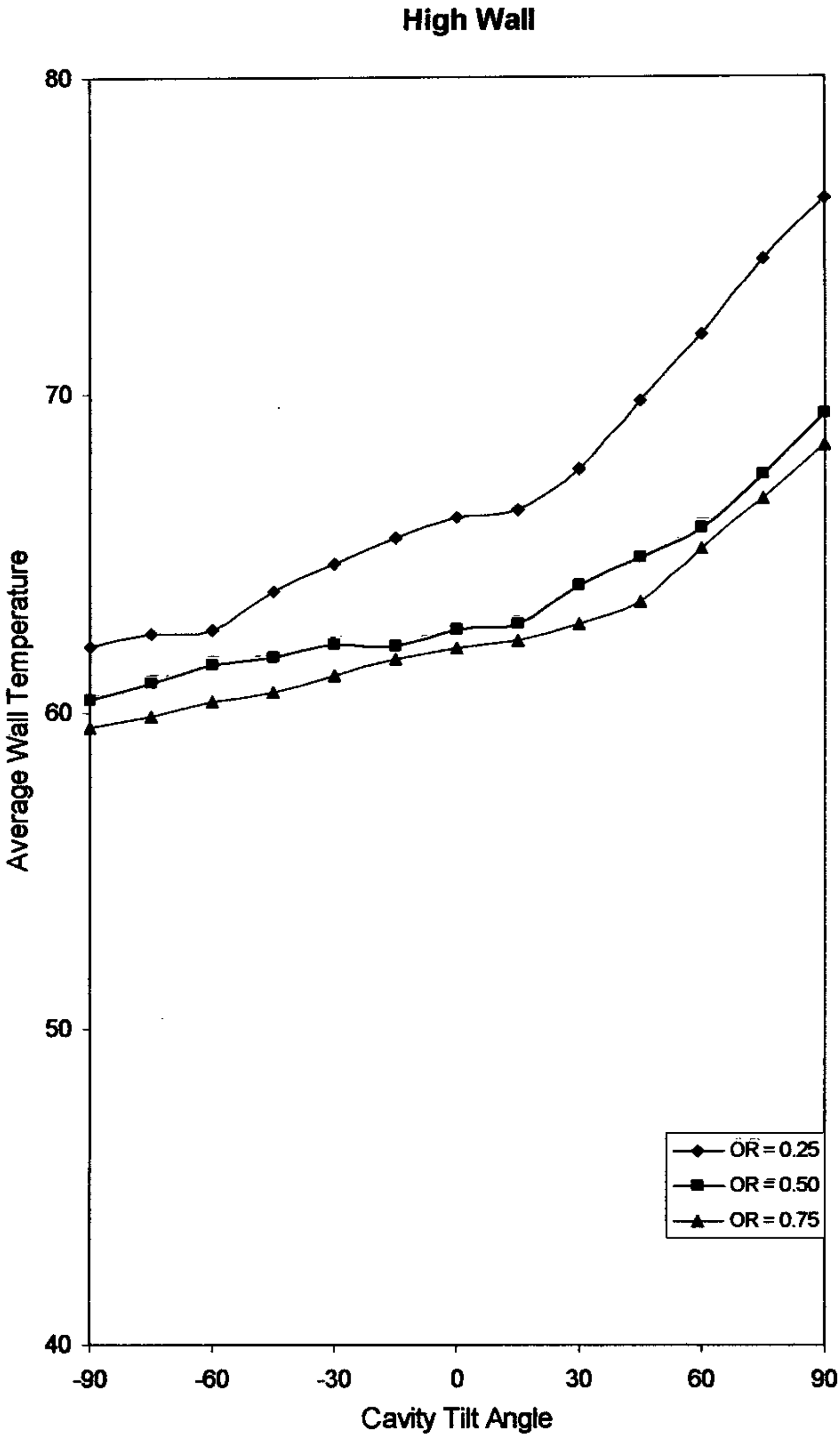



**Figure 5-1** Variation of average wall temperature with cavity tilt angle for high wall slit.

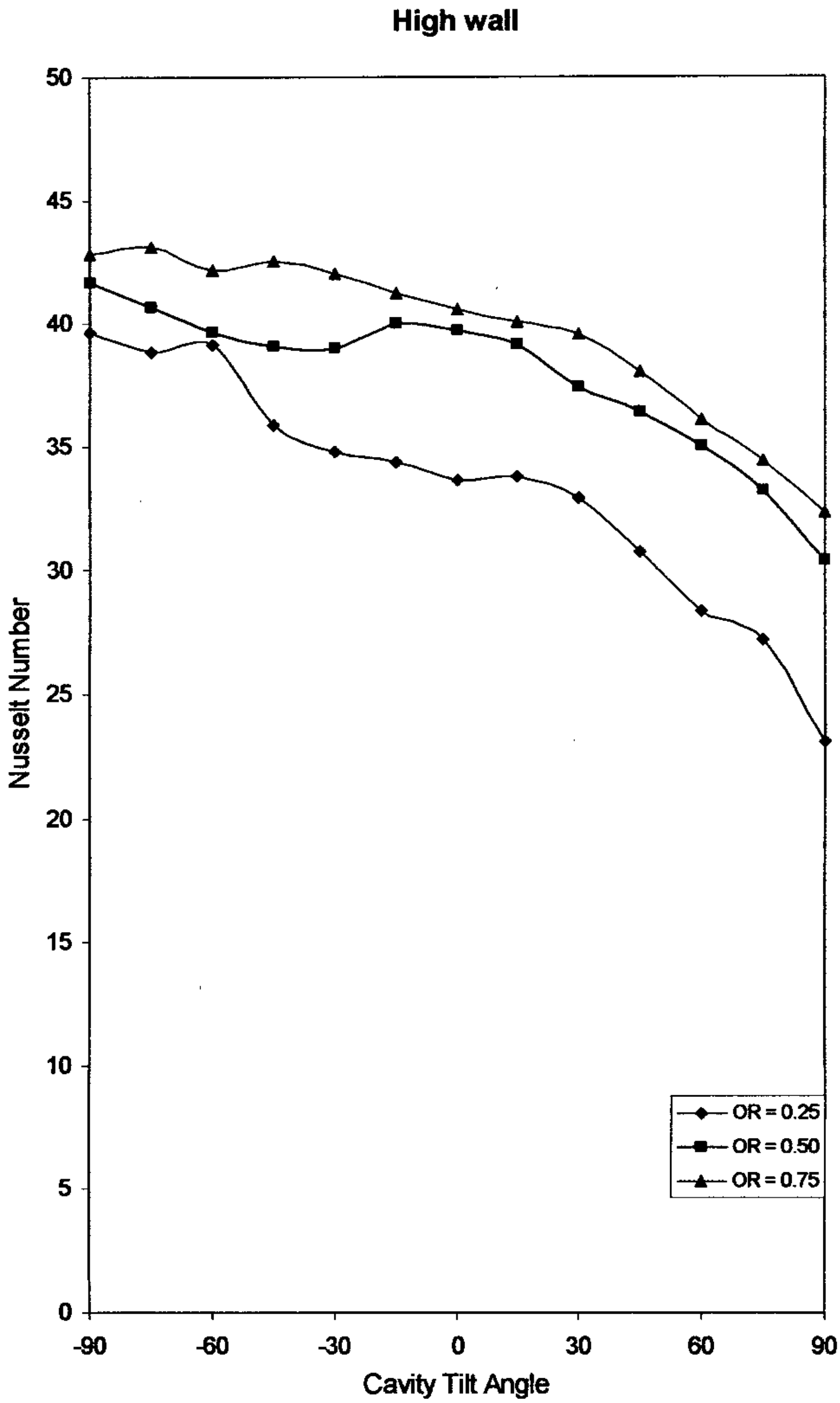



**Figure 5-2** Variation of Nusselt number with cavity tilt angle for high wall slit.

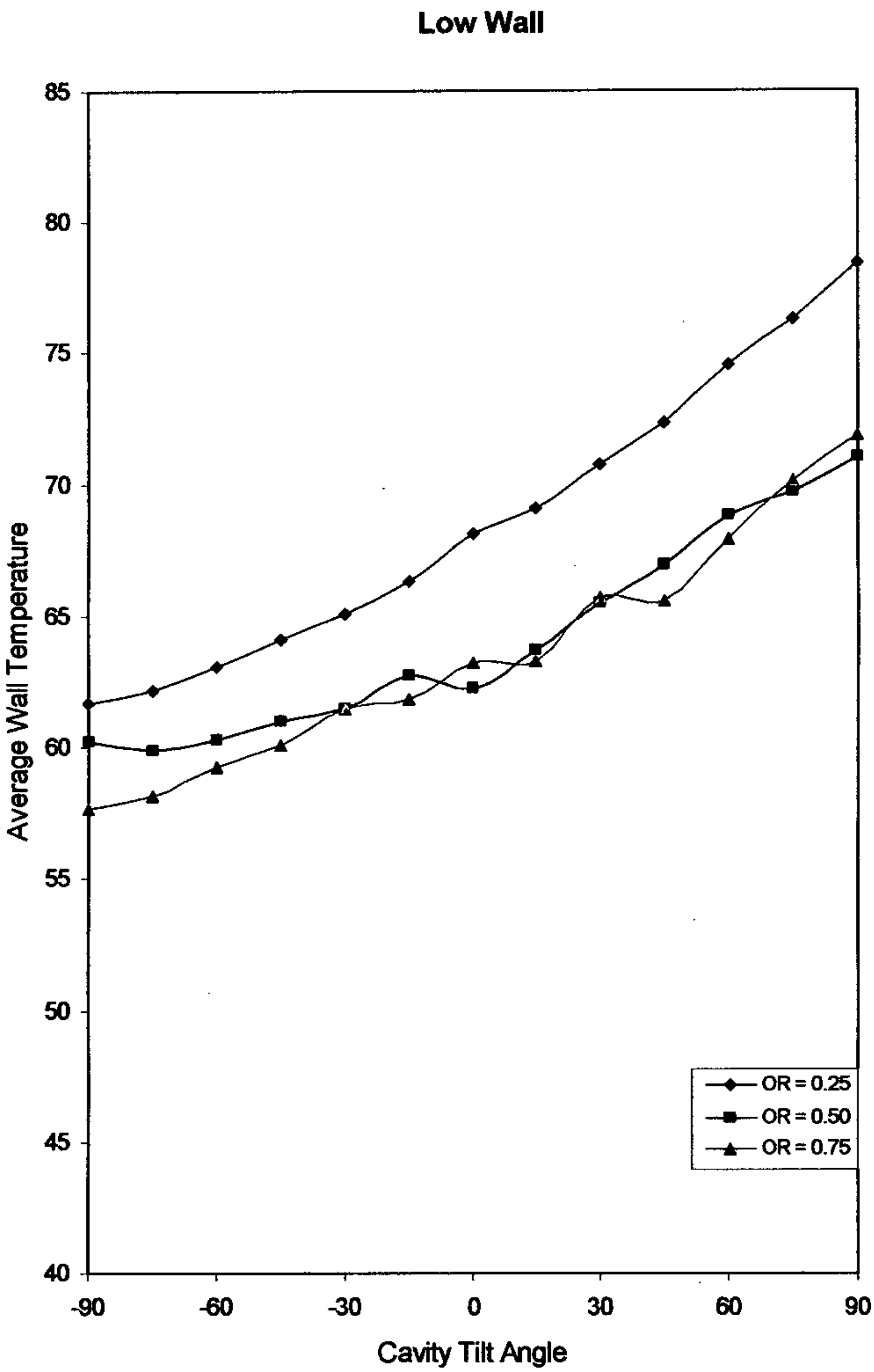



**Figure 5-3** Variation of average wall temperature with cavity tilt angle for low wall slit.

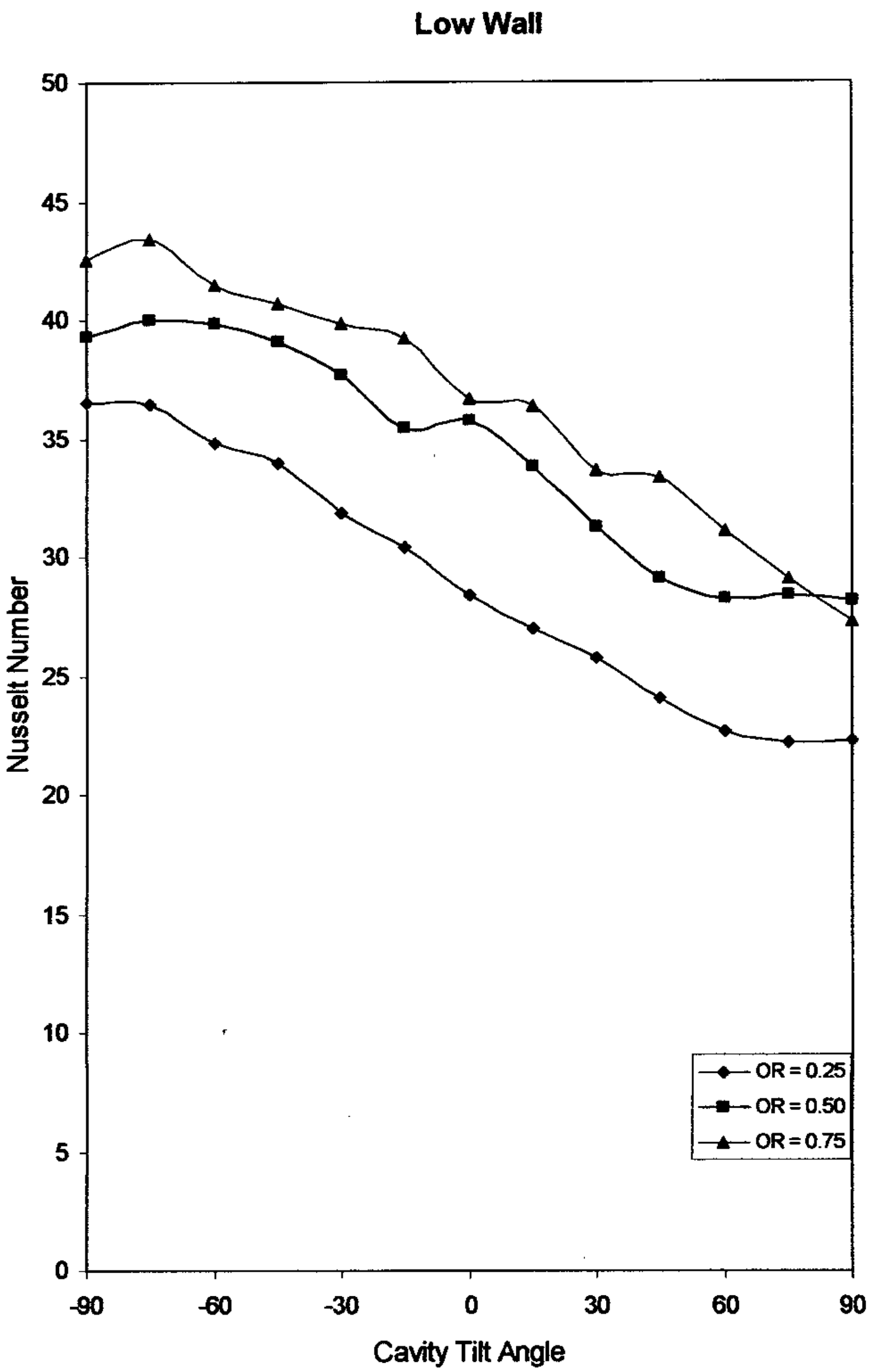



**Figure 5-4** Variation of Nusselt number with cavity tilt angle for low wall slit.

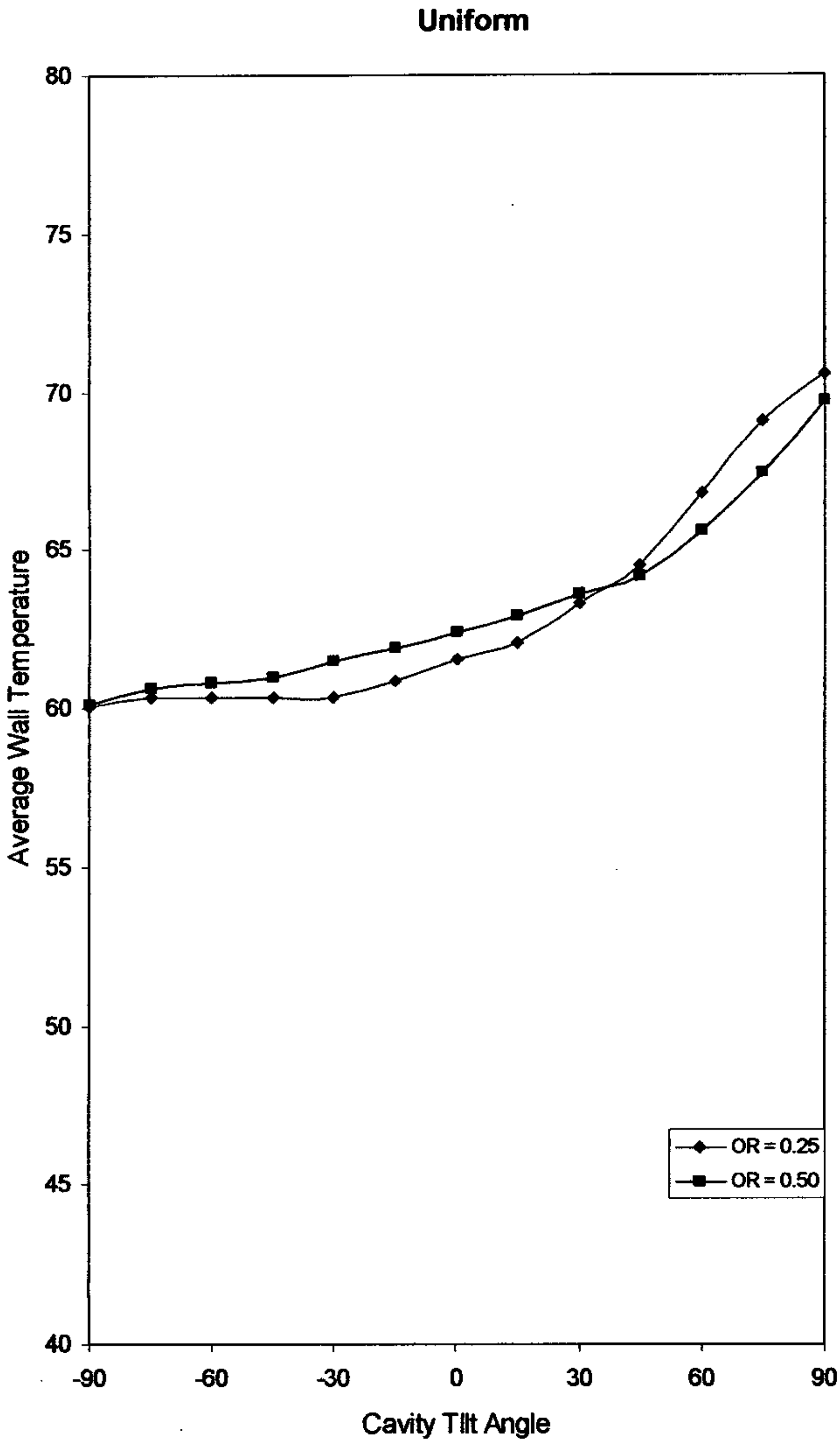



**Figure 5-5** Variation of average wall temperature with cavity tilt angle for uniform slots.

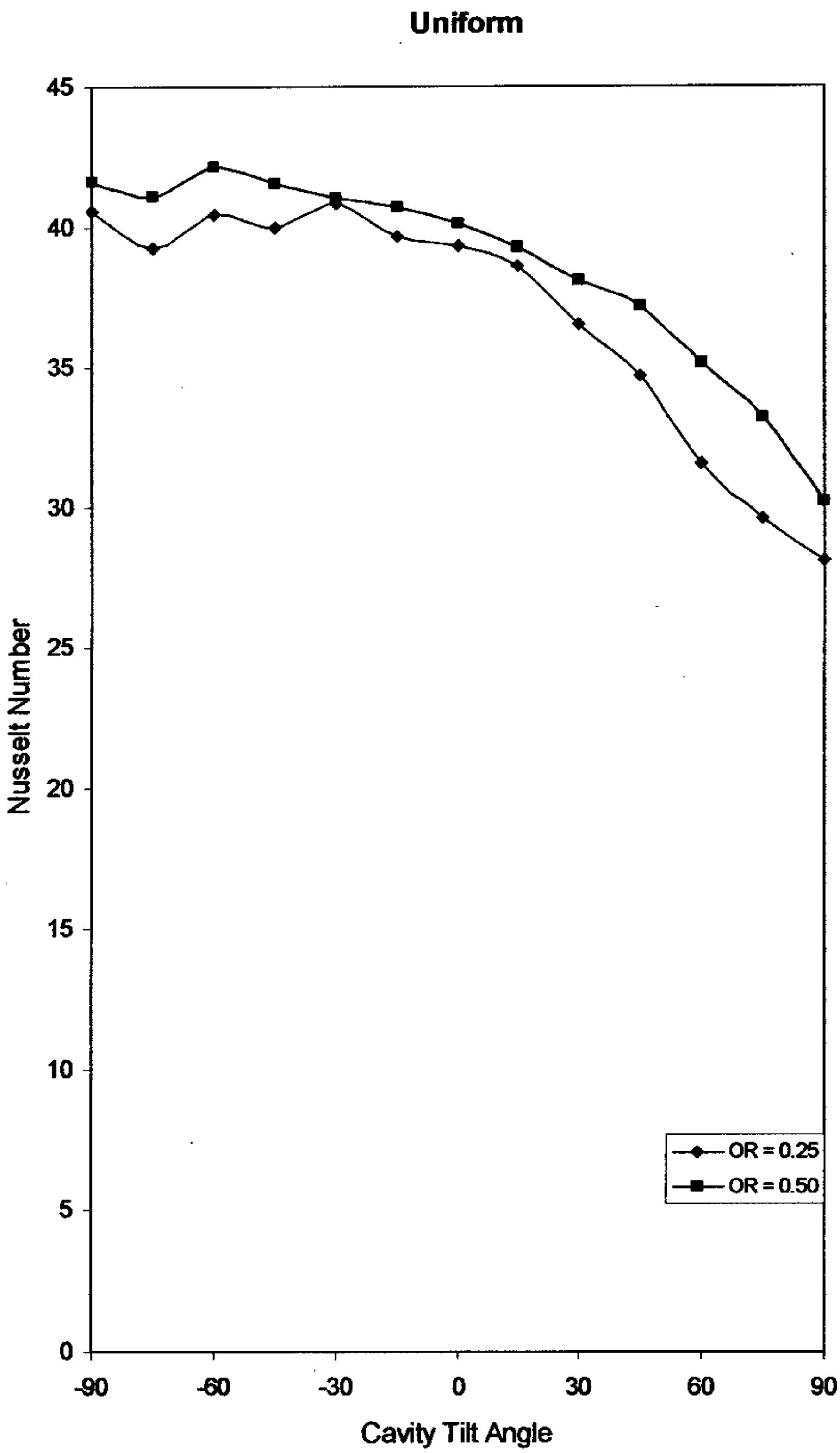



**Figure 5-6** Variation of Nusselt number with cavity tilt angle for uniform slots.

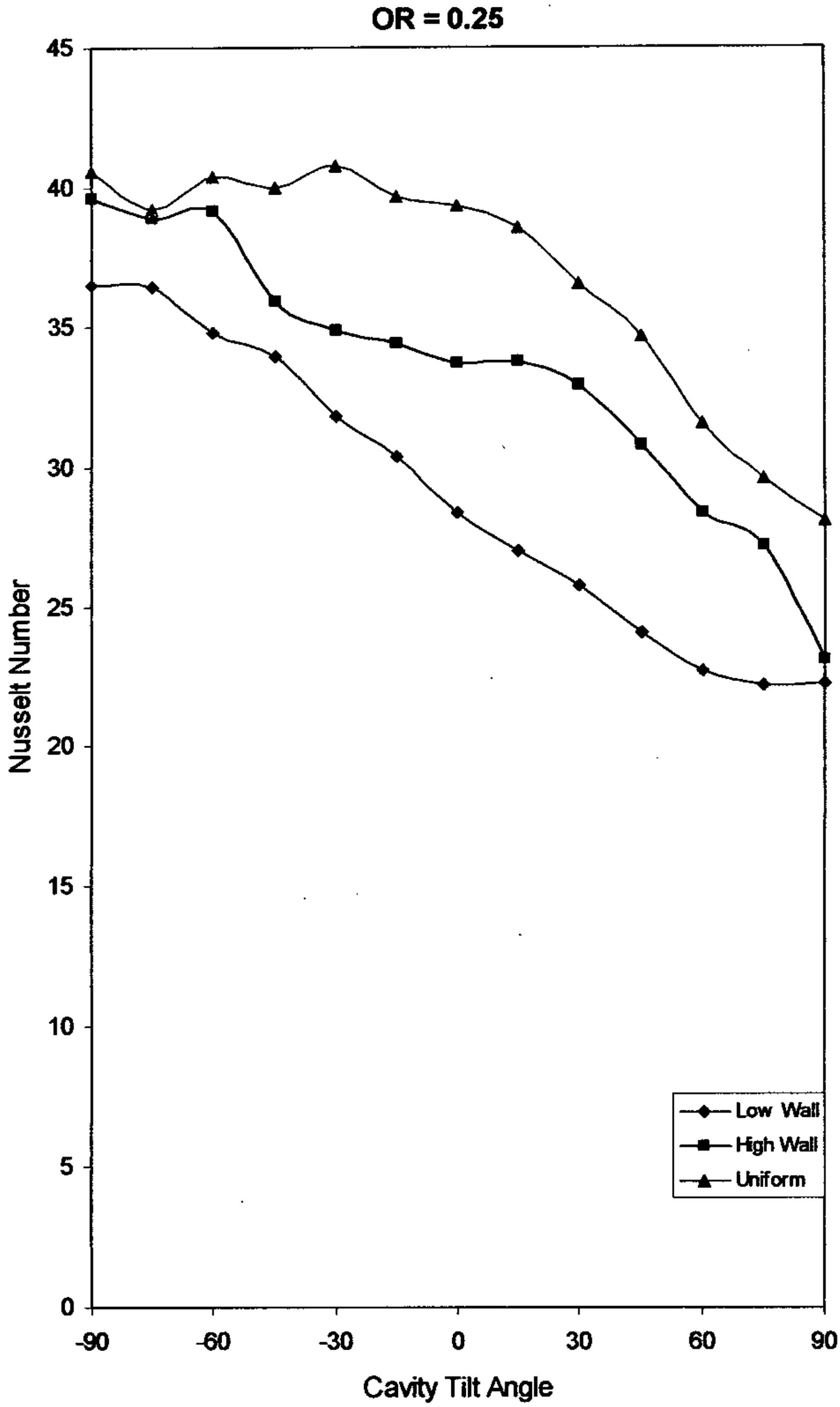



**Figure 5-7** Variation of Nusselt number with cavity tilt angles for three types of cavities at OR = 0.25

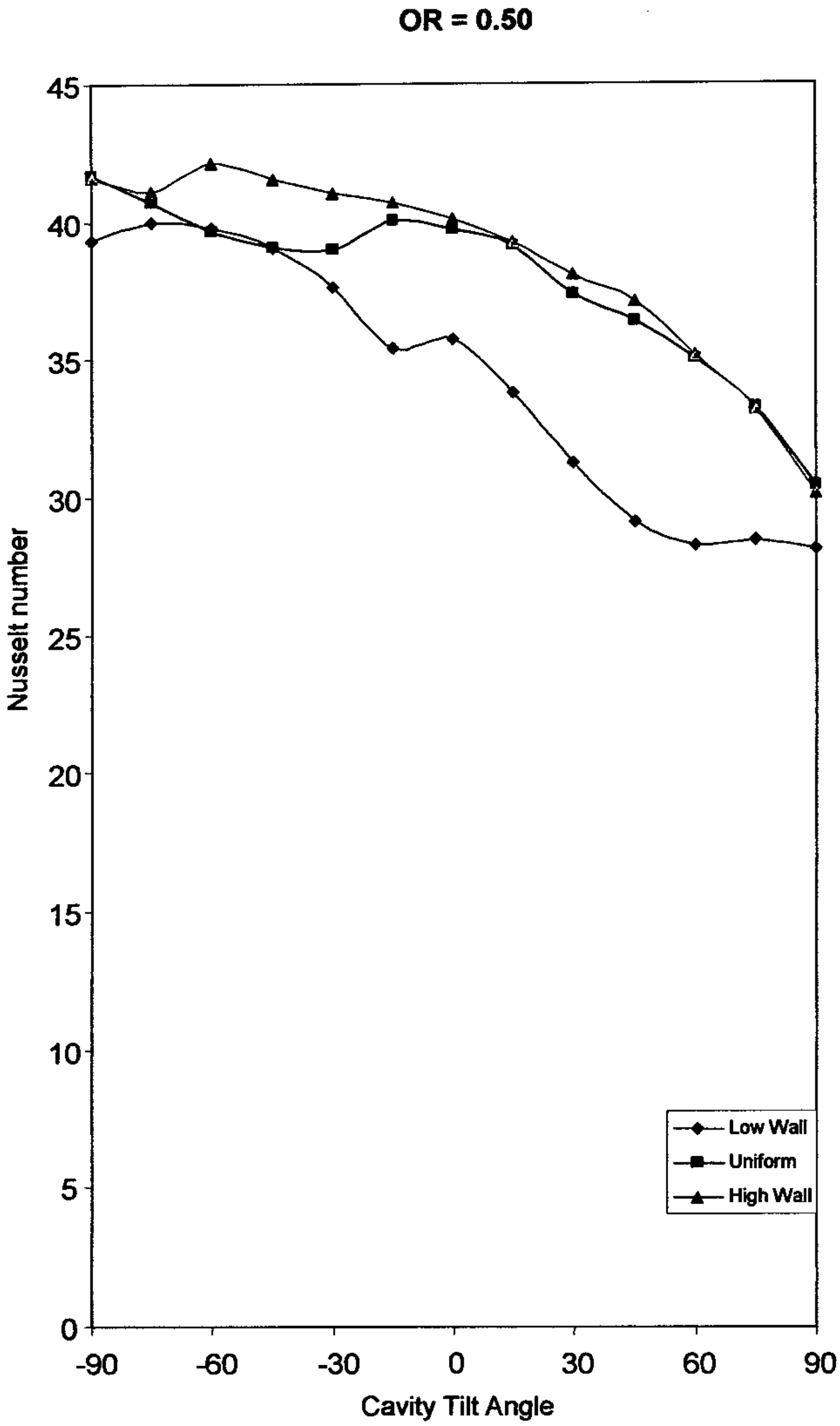



**Figure 5-8** Variation of Nusselt number with cavity tilt angles for three types of cavities at OR = 0.50

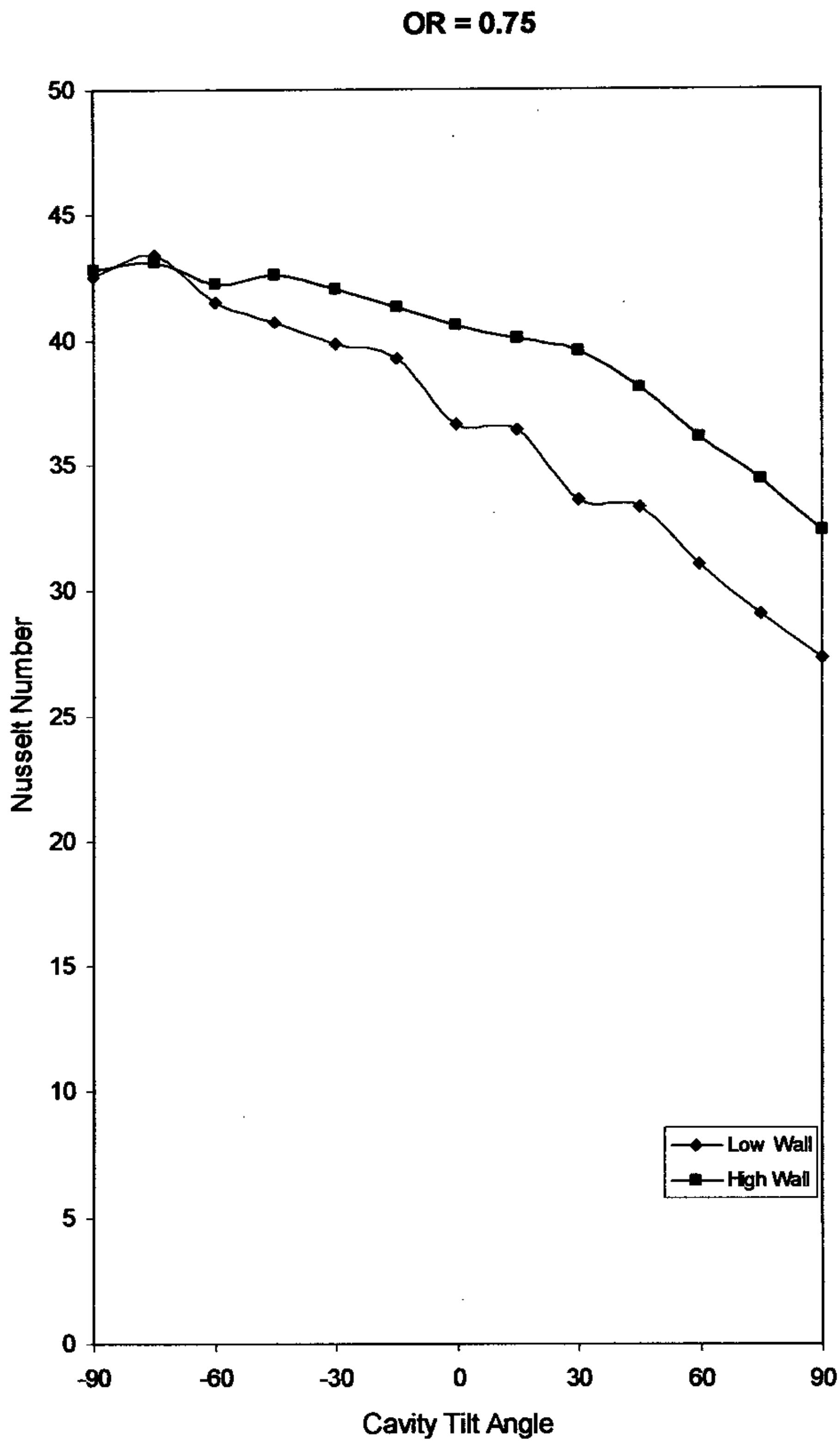



**Figure 5-9** Variation of Nusselt number with cavity tilt angles for two types of cavities at OR = 0.75

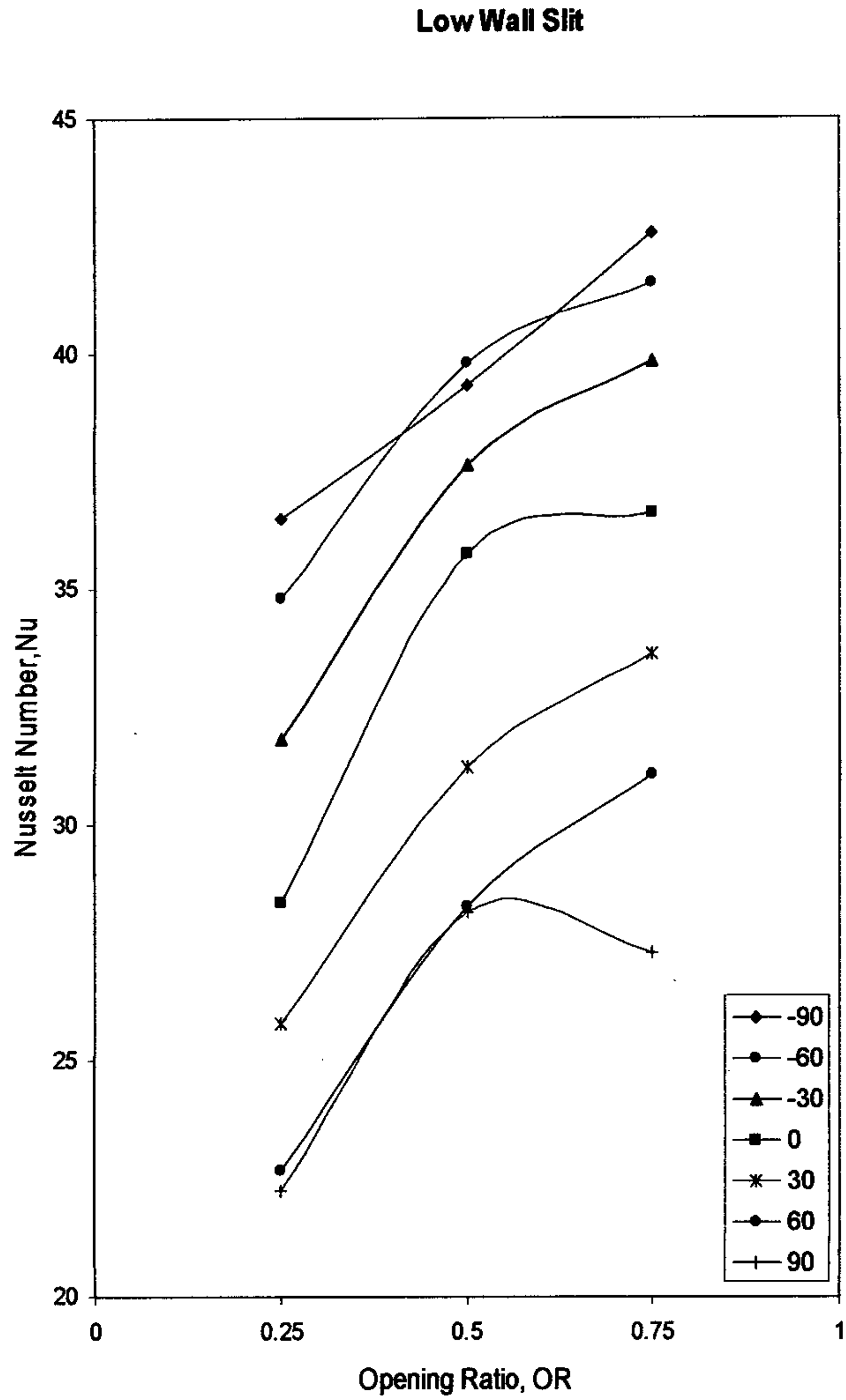



**Figure 5-10** Variation of Nusselt number with opening ratio for low wall slit

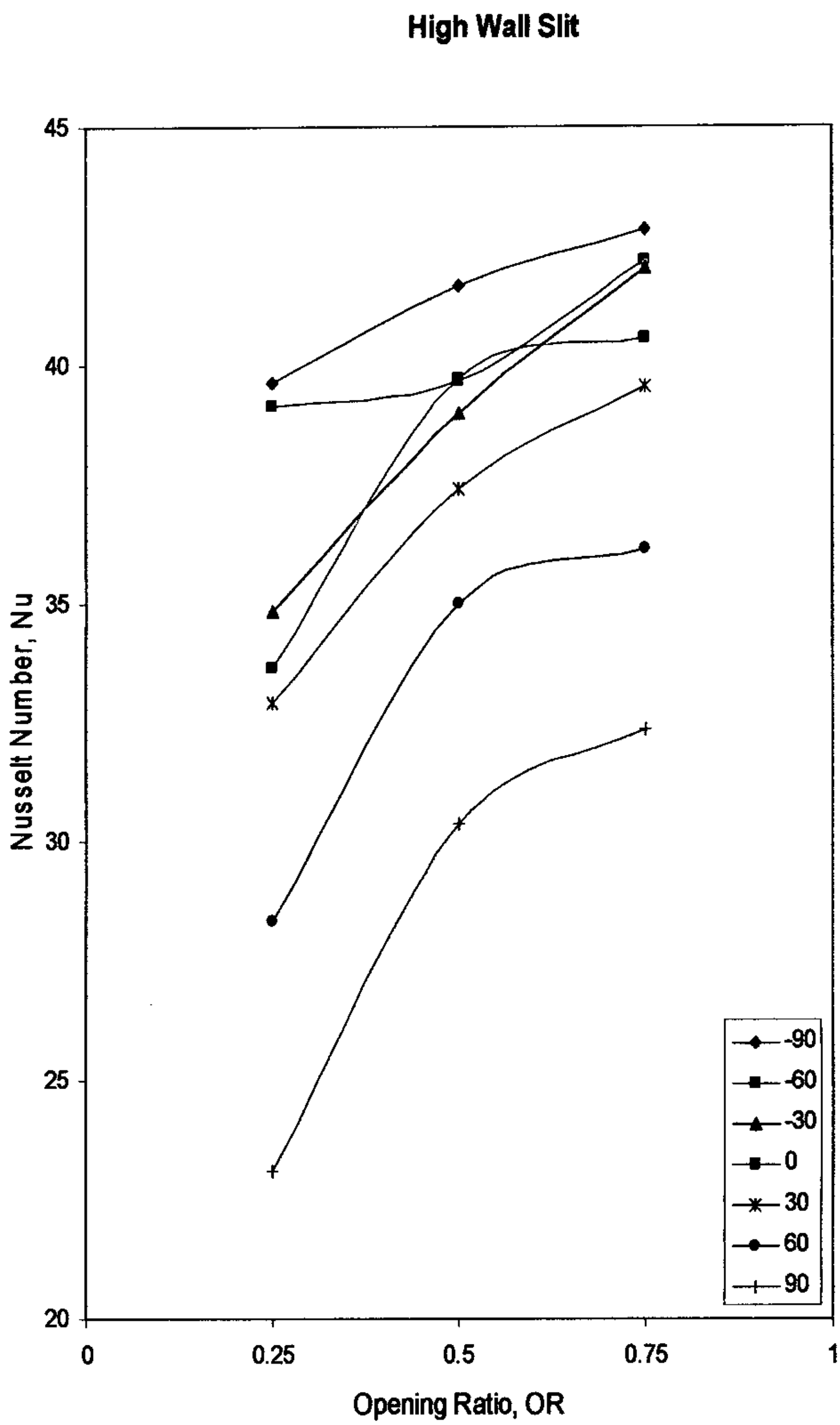



**Figure 5-11** Variation of Nusselt number with opening ratio for high wall slit

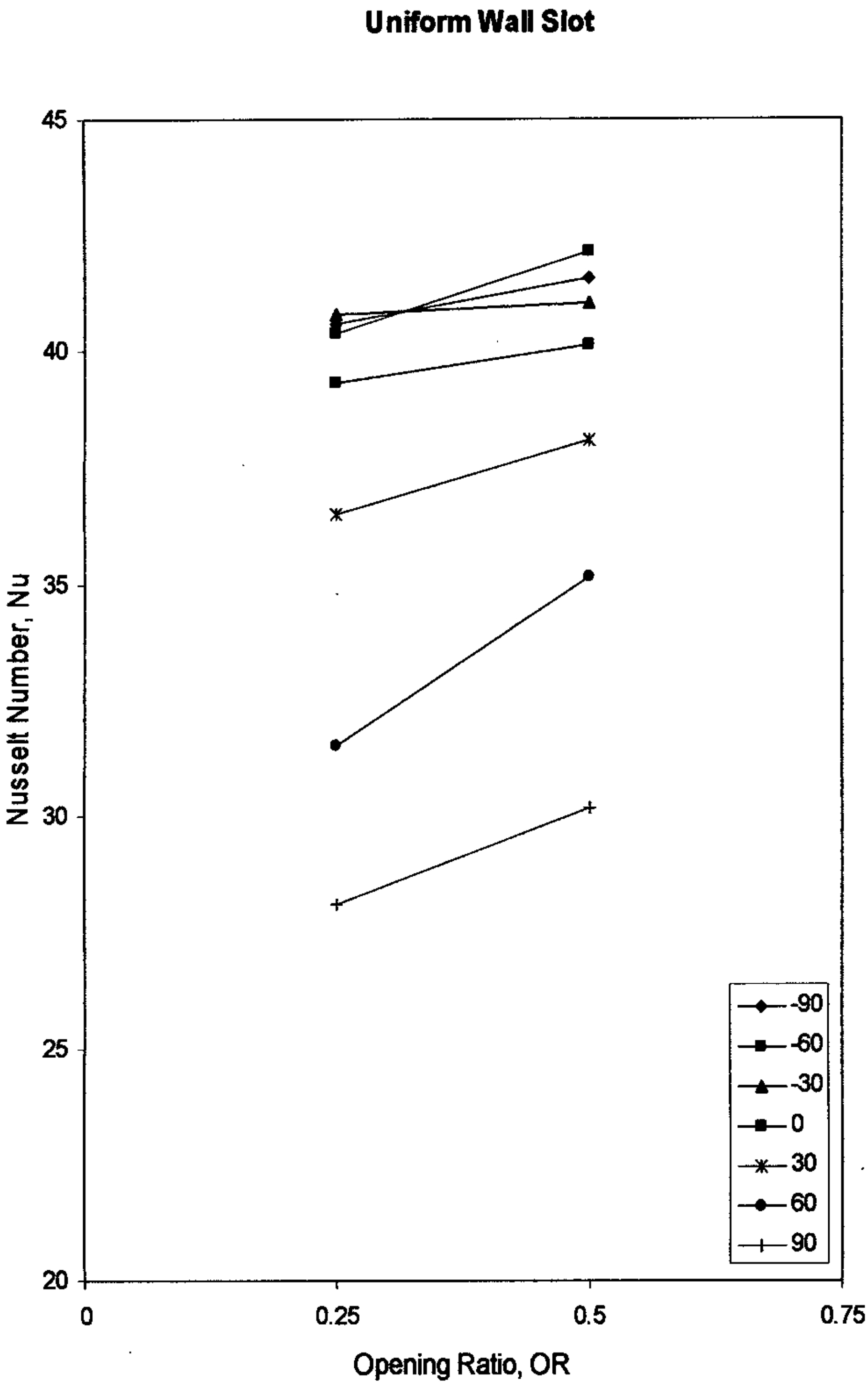



**Figure 5-12** Variation of Nusselt number with opening ratio for uniform wall slot.

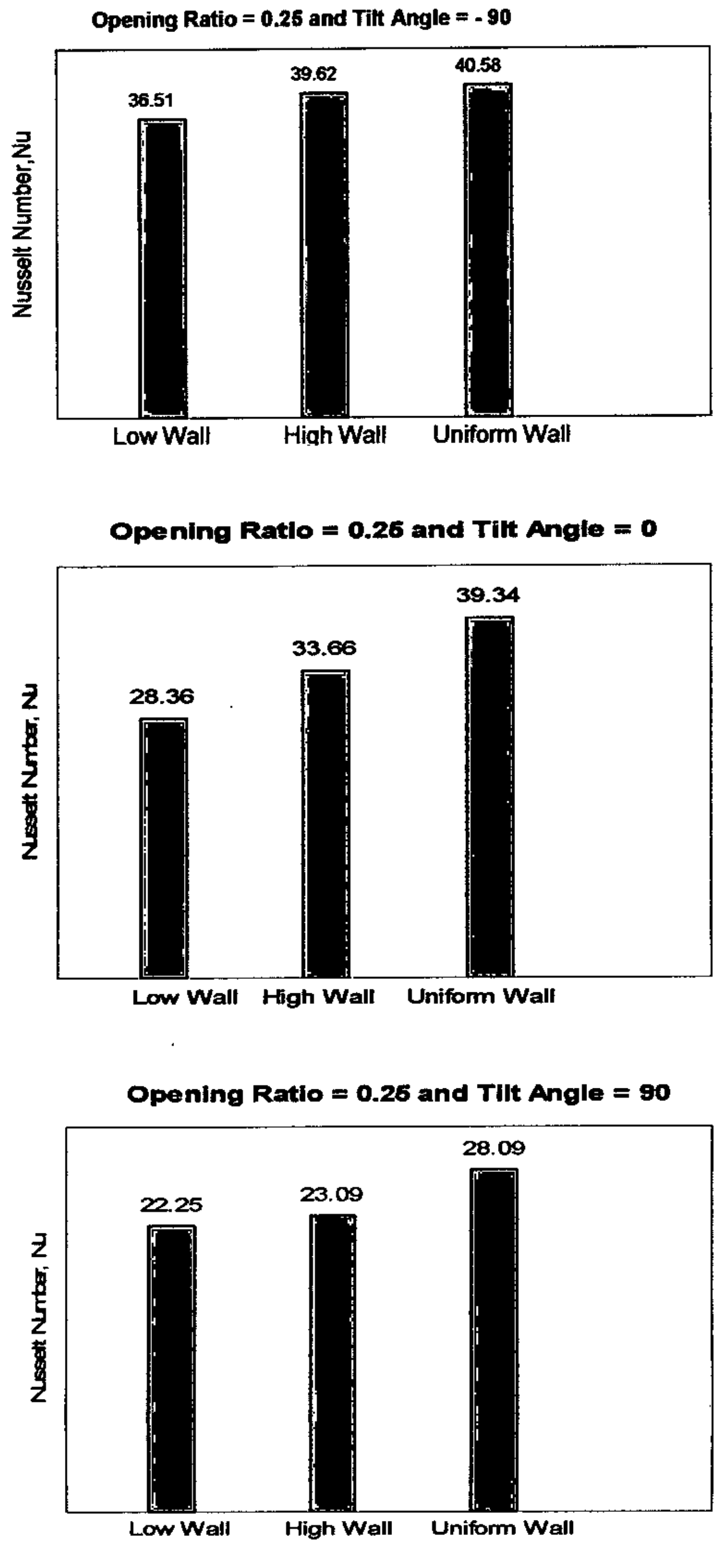



**Figure 5-13** Variation of Nusselt number with different slit position for OR = 0.25

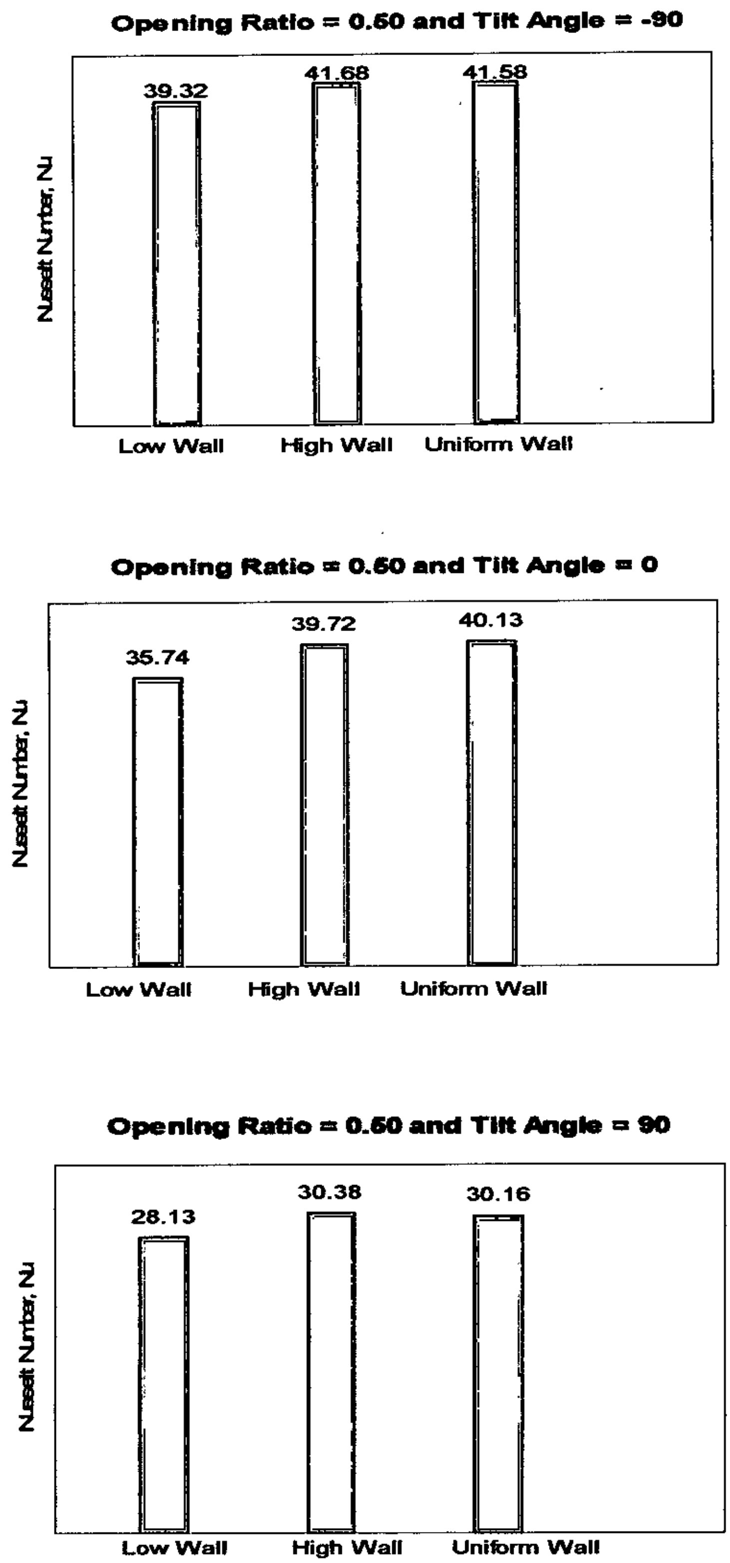



**Figure 5-14** Variation of Nusselt number with different slit position for OR = 0.50

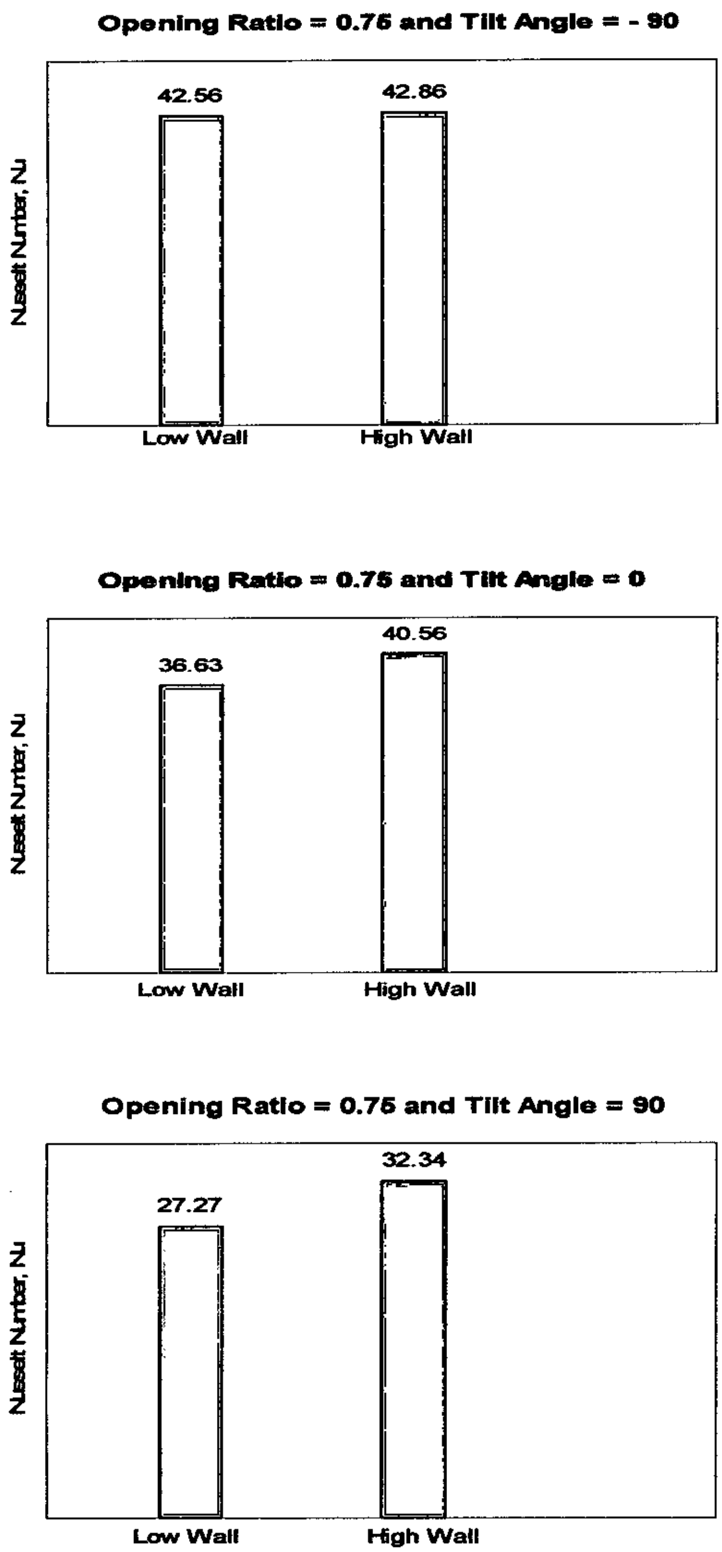
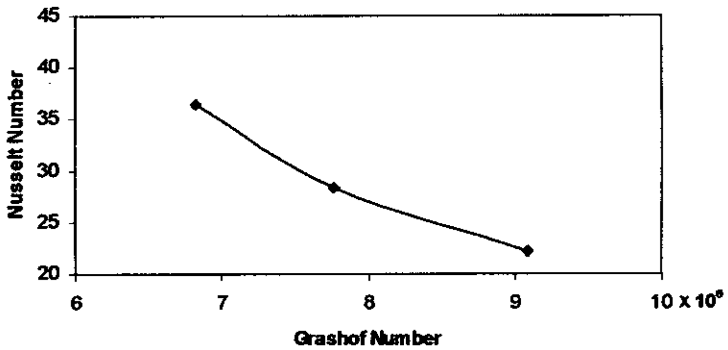
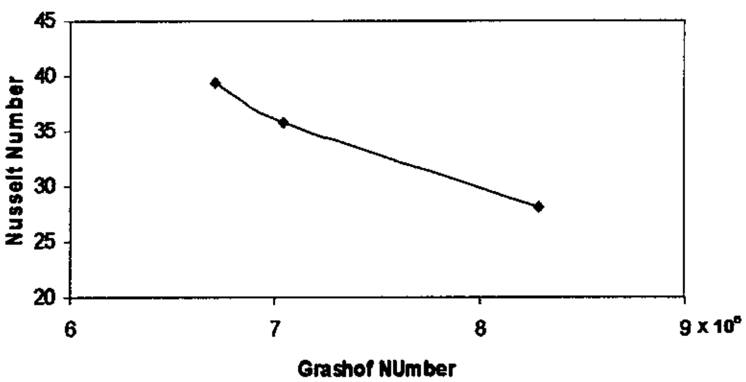



**Figure 5-15** Variation of Nusselt number with different slit position for OR = 0.75

OR=0.25




OR=0.50




OR=0.75

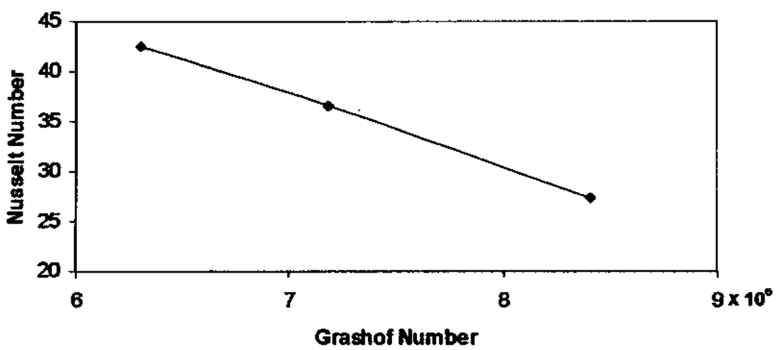



**Figure 5.16** Variation of Nusselt number with Grashof number for low wall slit.

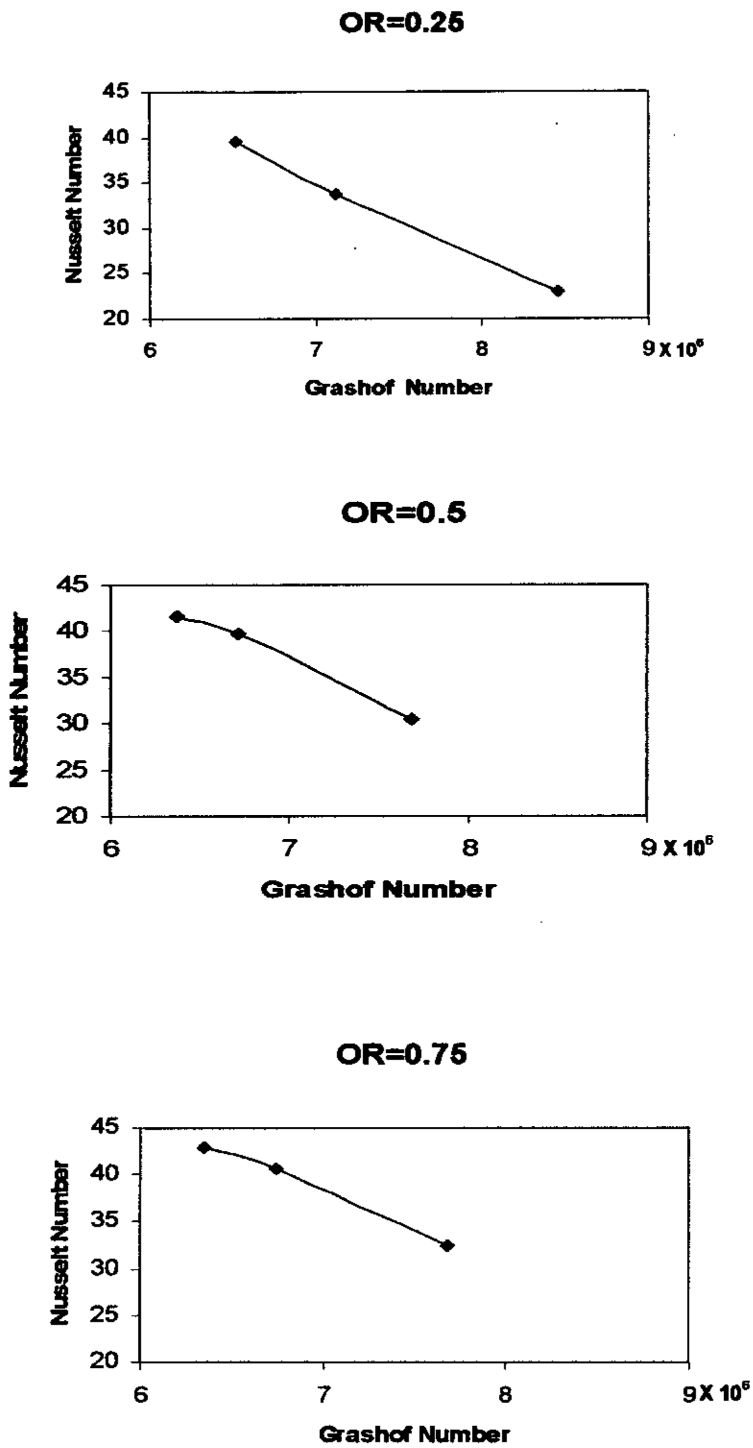
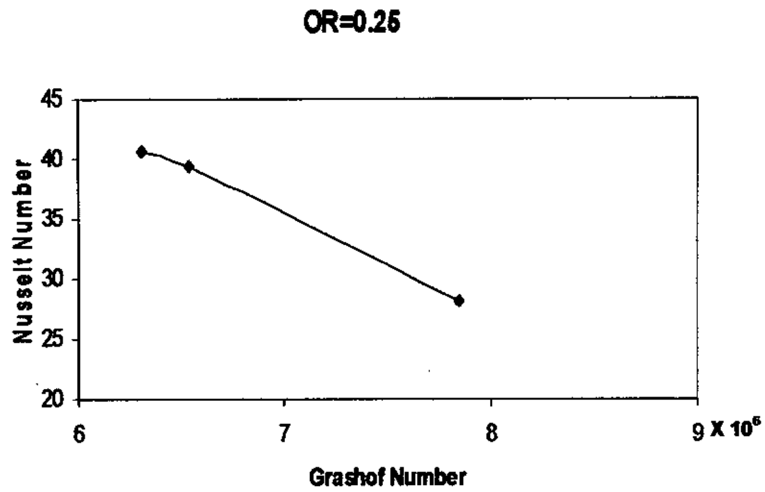



**Figure 5.17** Variation of Nusselt number with Grashof number for high wall slit.



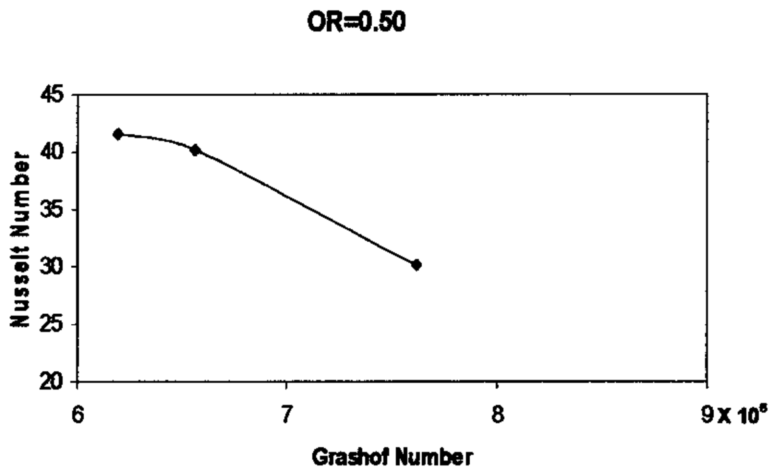




**Figure 5.18** Variation of Nusselt number with Grashof number for uniform wall slot.

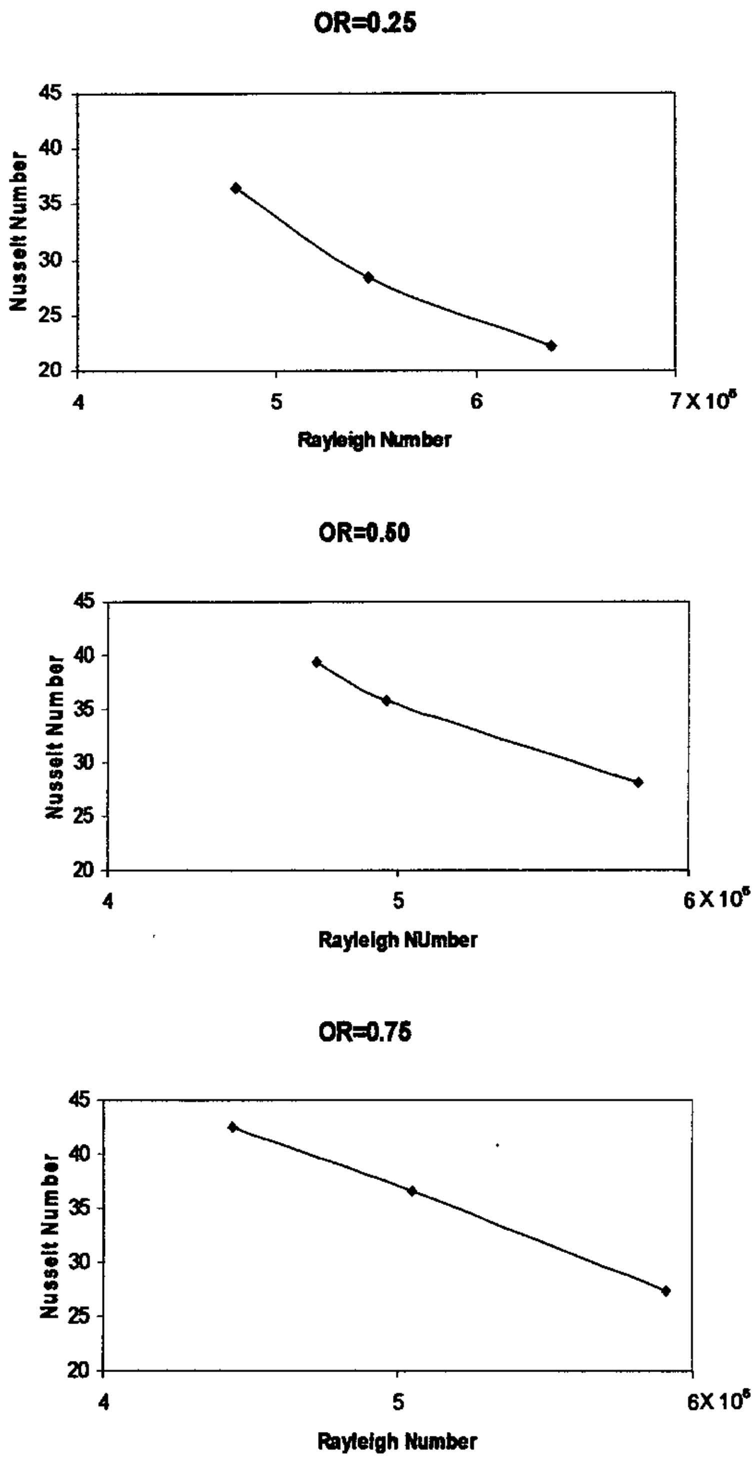



**Figure 5.19** Variation of Nusselt number with Rayleigh number for low wall slit.

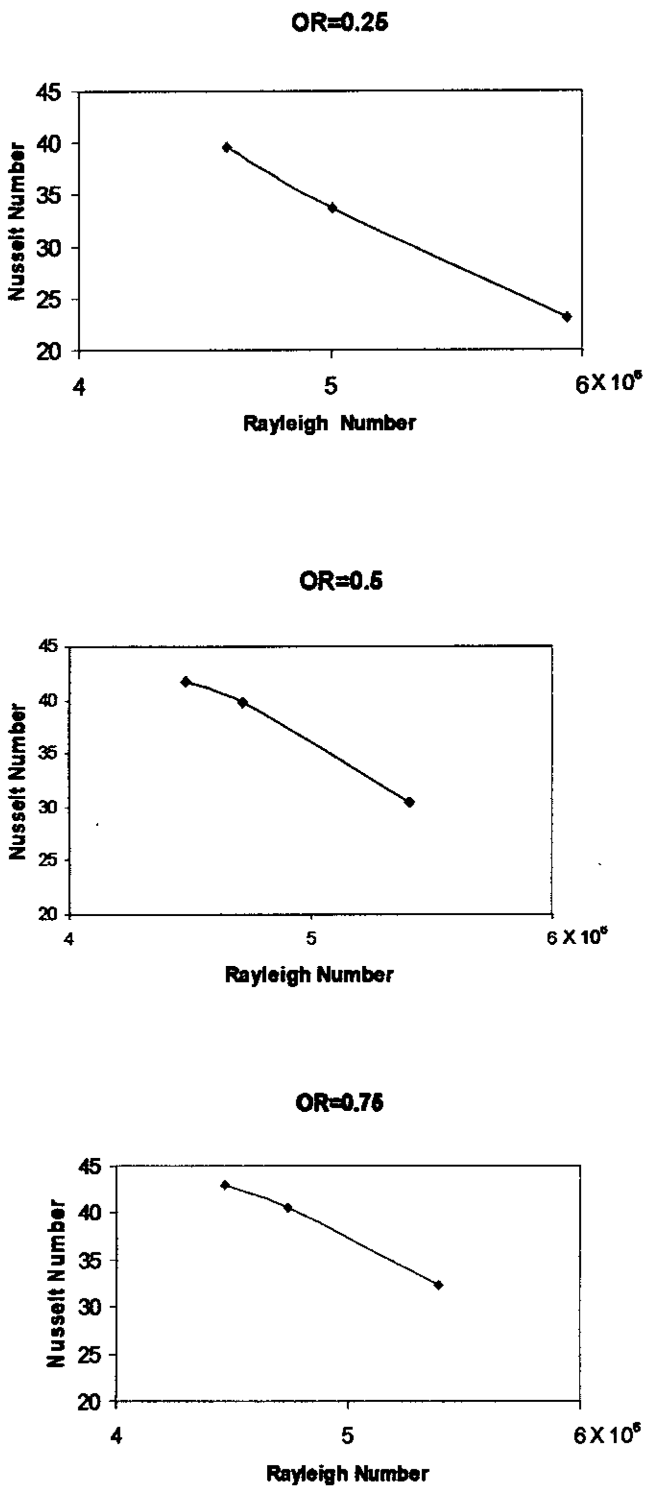
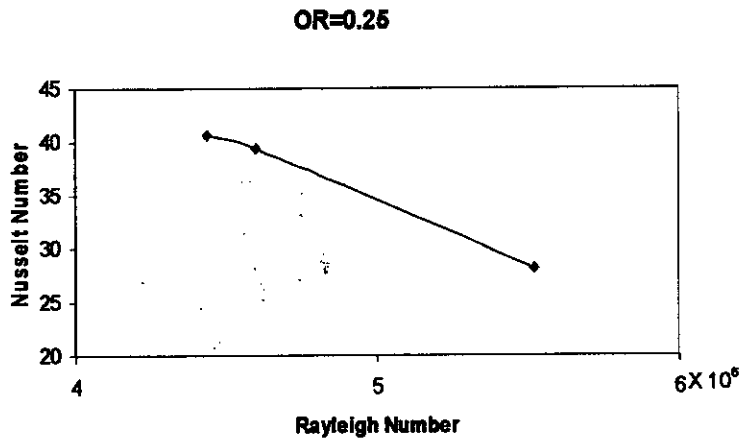



**Figure 5.20** Variation of Nusselt number with Rayleigh number for high wall slit.



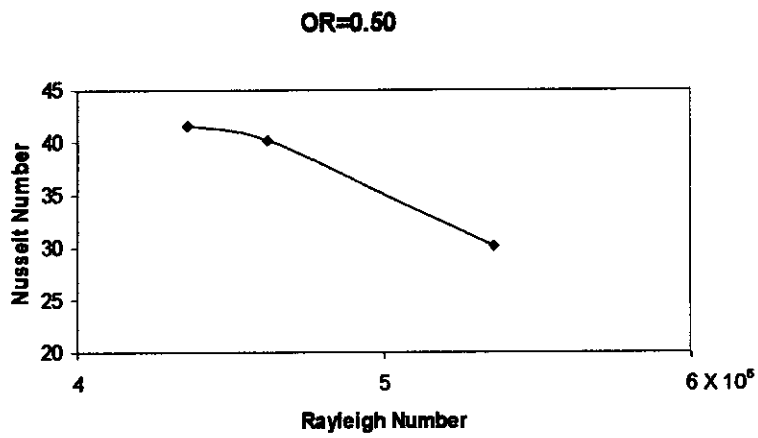




**Figure 5.21** Variation of Nusselt number with Rayleigh number for uniform wall slot.

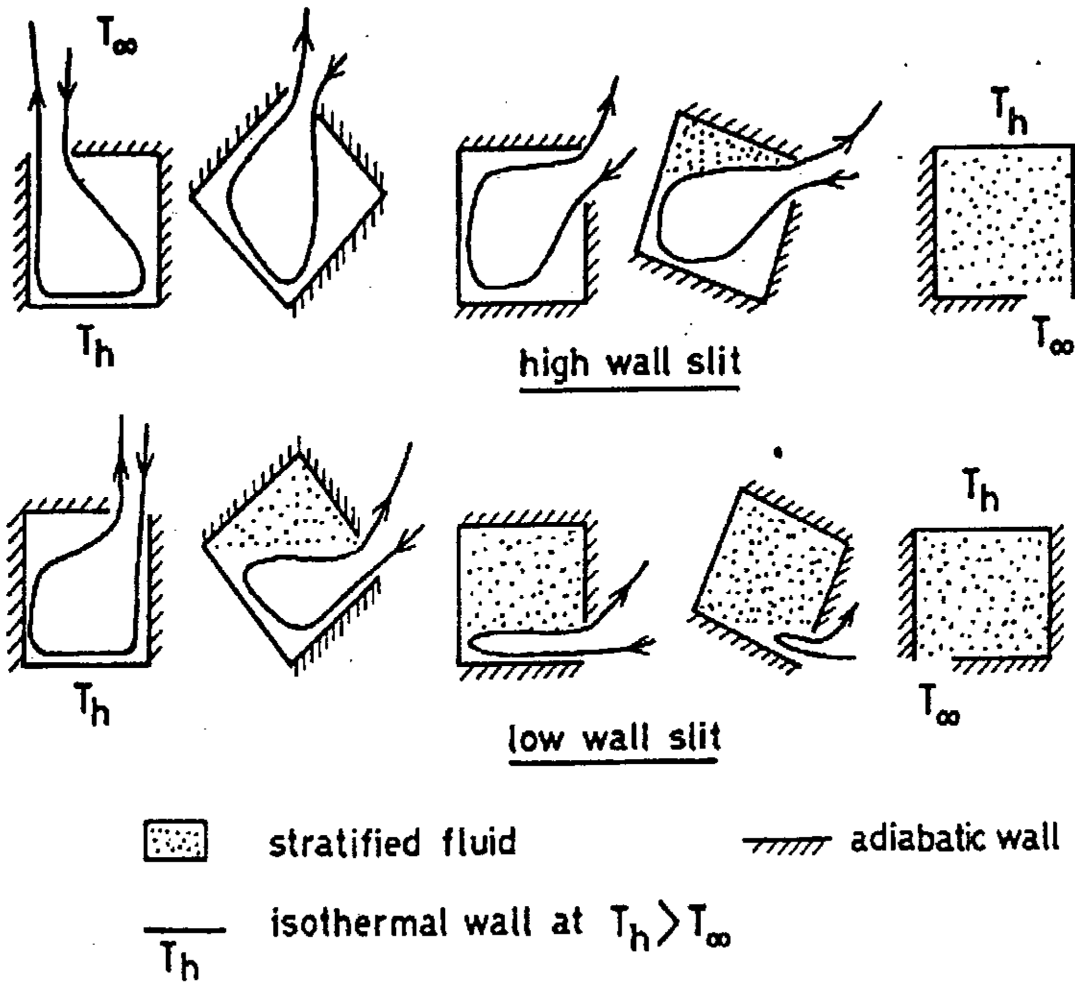



Figure 5-22 Effect of tilt angle and position of opening on the heat transfer from a cavity

# CHAPTER SIX

# CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Conclusions

Free convection heat transfer from rectangular, tilted partially open cavities has been investigated experimentally. Three different geometrical arrangements for the opening were considered: opening in the top, bottom, and opening in the form of slots distributed uniformly along the wall facing the heated surface. Conduction and radiation losses were taken into account in the determination of average Nusselt number of the cavity.

The important conclusions from the present investigations are enlisted below:

1. The Nusselt number for the heat transfer in the cavity always decreases with the increase of the tilt angle. However, the decrease of Nu in the positive range of tilt angles (0 to 90) is greater than the corresponding decrease in the negative range of tilt angles (-90 to 0).

2. For tilt angles of 90 deg, the Nusselt number and hence the heat transfer coefficient has the smallest value for all the geometrical arrangements of the opening.

3. Large differences in the Nusselt number were observed between the high and low wall slits.The high wall slit is found to transfer more heat to the surroundings than the low wall slit.

4. For an opening ratio of 0.25, the uniformly distributed wall slot have the highest heat transfer for all of tilt angle compared to the high and low wall slit.

5. For an opening ratio of 0.50, the high wall slit and the uniformly distributed slot show similar values of Nu particularly in the range of 0 to 90°.

6. The decrease of the opening ratio OR of the cavities generally leads to a decrease in the value of Nu regardless of the values of $\alpha$.

## 6.2 Recommendations

1. The variation of Nusselt number with cavity tilt angle for other opening ratio and aspect ratios can be carried out.

2. Investigation can be carried out with bodies of other geometries (i.e, square, triangular etc).

3. For further research work, heat transfer situation of other conditions of its wall (i.e,isothermal wall condition) can be investigated.

4. The effect of opening i.e, opening not in the form of slits but in the form of holes can also be studied.

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# APPENDIX-A

## CALIBRATION

All thermocouple wires and digital temperature meter were calibrated. Here one sample of them is shown to ensure the temperature measurement system.

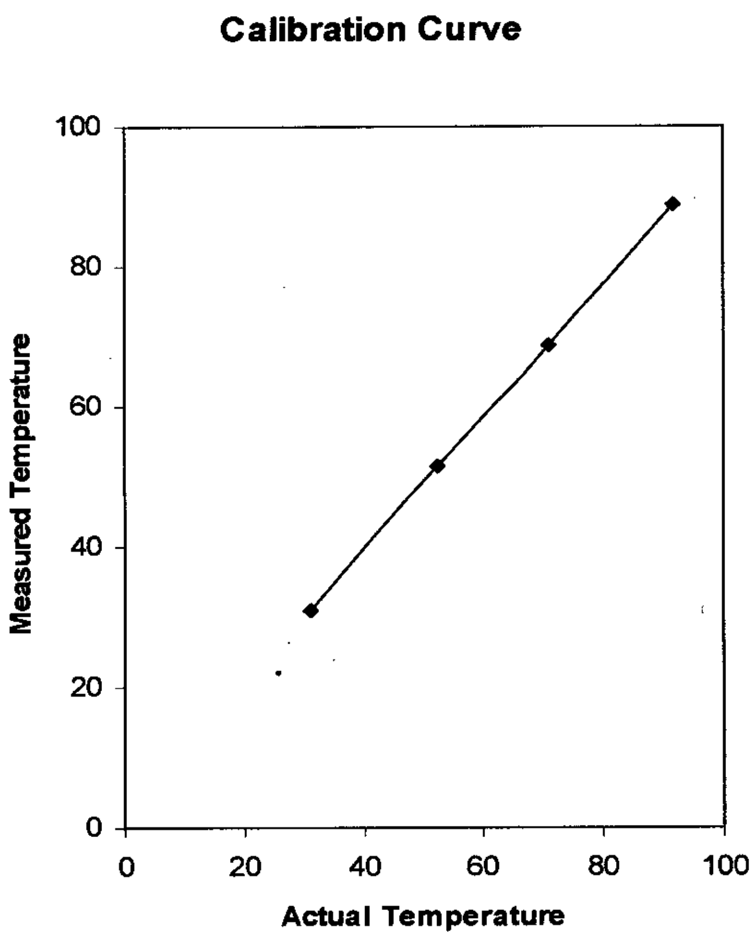


**Figure A-1** Calibration Curve for thermocouple wire as well as temperature meter

# APPENDIX-B

## SAMPLE CALCULATION

**For low wall slit, OR=0.25 and tilt angle = -90**

From equation 4-12, the conduction heat loss is

$$q_c = \frac{k_w}{B}\sum_{j=2}^{3}\int_{o}^{S_j}(T_{j,i} - T_{j,o})\frac{ds}{t_j} + \frac{k_w}{H}\sum_{j=4}\int_{0}^{s_j}(T_{j,i} - T_{j,o})\frac{ds}{t_j} + \frac{k_w}{H}\sum_{j=5}\int_{0}^{s_j}(T_{j,i} - T_{j,o})\frac{ds}{t_j}$$

$$= \frac{0.0723}{0.127}\{(43.70-39.03)+(46.90-38.03)\}\frac{0.127}{0.02}+\frac{0.0723}{0.178}(49.43-43.70)\frac{0.045}{0.02}+ \frac{0.0723}{0.178}(41047-37.60)\frac{0.178}{0.02}$$

= 0.569{(43.00-39.03) + (40.90-38.03)} * 6.35 + 0.406(49.43-43.70) * 2.25 + 0.406(41.47-37.60) * 8.90

= 43.92 W/m

From equation 4-11, the radiation heat loss is

$$q_r = \sigma\ [(T_p + 273)^4 - (T_\infty + 273)^4] \ / \left(\frac{1-\varepsilon}{\varepsilon}+\frac{1}{F_{pa}}\right)$$

$$= 5.67*10^{-8}\ [(61.66 + 273)^4 - (28.5 + 273)^4] \ / \left(\frac{1-0.04}{0.04}+\frac{1}{0.45}\right)$$

= 9.26 W/m

From equation 4-10, we have

$$\mathrm{Nu} = \frac{B}{5k}\sum_{i=1}^{5}\left\{\left(\frac{0.83IV}{HL} - q_c - q_r\right)/(T_{pi} - T_\infty)\right\}$$

$$= \frac{0.127}{0.027}\left\{\left(\frac{0.83*0.5*120}{0.178*0.914} - 43.92 - 9.26\right)/(61.66 - 28.5)\right\}$$

$$= 35.87$$

From equation 4-4, we have

$$\mathrm{Gr} = \frac{g\beta L^3 (T_w - T_\infty)}{\upsilon^2}$$

$$= \frac{9.8*(3.14*10^{-3})*0.127^3*(61.66 - 28.5)}{(17.51*10^{-6})^2}$$

$$= 6.82 * 10^6$$

Now, the Rayleigh number is

$$\mathrm{Ra} = \mathrm{Gr} * \mathrm{Pr}$$

$$= (6.82 * 10^6) * 0.704$$
$$= 4.80 * 10^6$$

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: -60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 44.0 | 49.7 | 45.3 | 51.1 | |
| | | 43.1 | 46.0 | 38.3 | 52.1 | |
| | | 43.1 | 43.9 | 36.7 | 52.6 | |
| | | | | | 51.6 | |
| | Average | 43.4 | 46.53 | 40.10 | 51.85 | |
| Outer | Local | 38.7 | 45.9 | 44.8 | 45.5 | 63.8 |
| | | 39.2 | 41.6 | 36.8 | 45.7 | 63.6 |
| | | 39.8 | 39.1 | 32.8 | 46.2 | 62.4 |
| | | | | | 46.2 | 63.0 |
| | | | | | | 62.5 |
| | Average | 39.23 | 42.2 | 38.13 | 45.9 | 63.06 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: -45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 45.4 | 51.6 | 44.8 | 51.2 | |
| | | 43.8 | 47.1 | 38.4 | 52.4 | |
| | | 43.0 | 44.7 | 33.5 | 53.1 | |
| | | | | | 51.7 | |
| | Average | 44.07 | 47.80 | 38.90 | 52.10 | |
| Outer | Local | 40.1 | 46.8 | 44.0 | 45.8 | 64.1 |
| | | 39.8 | 42.5 | 36.6 | 46.2 | 65.8 |
| | | 39.6 | 39.8 | 32.7 | 46.6 | 63.1 |
| | | | | | 46.4 | 64.1 |
| | | | | | | 63.5 |
| | Average | 39.83 | 43.03 | 37.77 | 46.25 | 64.12 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: -30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 46.5 | 54.2 | 45.0 | 52.0 | |
| | | 45.1 | 48.4 | 38.3 | 53.2 | |
| | | 43.2 | 45.9 | 36.4 | 53.4 | |
| | | | | | 52.3 | |
| | Average | 44.93 | 49.50 | 39.90 | 52.73 | |
| Outer | Local | 39.7 | 47.8 | 44.3 | 46.2 | 65.4 |
| | | 40.3 | 43.2 | 36.7 | 46.7 | 65.2 |
| | | 38.7 | 40.1 | 32.8 | 47.0 | 64.7 |
| | | | | | 46.9 | 65.0 |
| | | | | | | 64.9 |
| | Average | 39.57 | 43.70 | 37.93 | 46.70 | 65.04 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: -15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 47.1 | 56.7 | 45.0 | 53.4 | |
| | | 46.2 | 49.7 | 38.4 | 54.6 | |
| | | 44.8 | 47.0 | 36.7 | 55.1 | |
| | | | | | 53.7 | |
| | Average | 46.03 | 51.13 | 40.03 | 54.20 | |
| Outer | Local | 40.3 | 48.8 | 44.8 | 47.7 | 66.6 |
| | | 40.9 | 44.3 | 36.5 | 48.1 | 66.6 |
| | | 41.0 | 41.2 | 32.7 | 48.4 | 66.4 |
| | | | | | 48.0 | 66.3 |
| | | | | | | 65.8 |
| | Average | 40.73 | 44.77 | 38.00 | 48.05 | 66.34 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: 0°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 48.4 | 59.0 | 45.7 | 54.3 | |
| | | 47.5 | 51.6 | 38.8 | 55.5 | |
| | | 45.3 | 48.7 | 36.8 | 55.7 | |
| | | | | | 54.3 | |
| | Average | 47.07 | 53.10 | 40.43 | 54.95 | |
| Outer | Local | 41.3 | 50.0 | 45.0 | 48.5 | 68.2 |
| | | 41.9 | 45.4 | 36.7 | 48.8 | 68.3 |
| | | 40.8 | 42.0 | 32.9 | 49.0 | 68.5 |
| | | | | | 48.5 | 67.9 |
| | | | | | | 67.6 |
| | Average | 41.33 | 45.80 | 38.20 | 48.70 | 68.10 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: 15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 50.0 | 60.4 | 47.3 | 54.3 | |
| | | 48.0 | 52.7 | 39.5 | 56.2 | |
| | | 45.5 | 49.8 | 37.2 | 56.6 | |
| | | | | | 55.1 | |
| | Average | 47.83 | 54.30 | 41.33 | 55.68 | |
| Outer | Local | 42.0 | 50.7 | 45.5 | 49.3 | 69.2 |
| | | 42.4 | 46.0 | 36.7 | 49.4 | 69.3 |
| | | 41.0 | 42.5 | 32.8 | 49.6 | 68.9 |
| | | | | | 49.2 | 69.2 |
| | | | | | | 68.7 |
| | Average | 41.80 | 46.40 | 38.33 | 49.38 | 69.06 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: 30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 50.6 | 62.2 | 48.0 | 56.3 | |
| | | 48.8 | 54.0 | 40.0 | 57.2 | |
| | | 45.6 | 51.0 | 36.7 | 57.5 | |
| | | | | | 55.8 | |
| | Average | 48.33 | 55.73 | 41.57 | 56.70 | |
| Outer | Local | 42.5 | 51.8 | 46.0 | 50.1 | 71.0 |
| | | 43.0 | 47.2 | 37.5 | 50.2 | 71.2 |
| | | 40.8 | 43.5 | 33.4 | 50.2 | 70.6 |
| | | | | | 49.6 | 70.6 |
| | | | | | | 70.3 |
| | Average | 42.10 | 47.50 | 38.97 | 50.3 | 70.74 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: 45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 50.5 | 63.7 | 50.0 | 56.4 | |
| | | 48.4 | 55.0 | 41.8 | 57.5 | |
| | | 45.0 | 51.9 | 39.4 | 58.0 | |
| | | | | | 56.4 | |
| | Average | 47.97 | 56.87 | 43.73 | 57.08 | |
| Outer | Local | 42.8 | 52.6 | 46.8 | 50.6 | 72.7 |
| | | 43.0 | 47.9 | 37.6 | 50.6 | 72.5 |
| | | 41.0 | 44.1 | 33.6 | 50.7 | 72.0 |
| | | | | | 50.0 | 72.3 |
| | | | | | | 72.1 |
| | Average | 42.27 | 48.20 | 39.33 | 50.48 | 72.32 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: 60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 50.2 | 65.7 | 51.9 | 56.4 | |
| | | 48.4 | 56.3 | 43.2 | 57.6 | |
| | | 44.8 | 53.0 | 40.4 | 58.0 | |
| | | | | | 56.5 | |
| | Average | 47.8 | 58.33 | 45.17 | 57.13 | |
| Outer | Local | 43.3 | 54.1 | 47.6 | 50.6 | 74.8 |
| | | 43.5 | 49.2 | 38.6 | 50.6 | 74.8 |
| | | 41.4 | 45.3 | 34.3 | 51.0 | 74.2 |
| | | | | | 50.3 | 74.7 |
| | | | | | | 74.2 |
| | Average | 42.73 | 49.53 | 40.17 | 50.63 | 74.54 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: 75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 47.6 | 65.1 | 54.1 | 59.8 | |
| | | 47.1 | 54.8 | 45.8 | 60.2 | |
| | | 44.9 | 50.4 | 42.1 | 60.6 | |
| | | | | | 59.2 | |
| | Average | 46.53 | 56.77 | 47.33 | 59.95 | |
| Outer | Local | 43.1 | 54.7 | 49.7 | 52.5 | 76.5 |
| | | 43.1 | 49.5 | 39.6 | 52.5 | 76.5 |
| | | 41.6 | 45.1 | 34.9 | 52.8 | 76.0 |
| | | | | | 52.1 | 76.4 |
| | | | | | | 76.1 |
| | Average | 42.60 | 49.77 | 41.40 | 52.48 | 76.30 |

**Slit: Low wall Opening Ratio: 0.25 Cavity Tilt Angle: 90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 46.6 | 59.4 | 58.0 | 59.5 | |
| | | 46.8 | 51.6 | 47.3 | 60.8 | |
| | | 44.4 | 48.5 | 44.0 | 61.3 | |
| | | | | | 59.8 | |
| | Average | 45.93 | 53.17 | 49.77 | 60.35 | |
| Outer | Local | 42.7 | 55.5 | 50.8 | 52.7 | 79.1 |
| | | 44.2 | 49.5 | 41.1 | 52.9 | 78.2 |
| | | 41.4 | 45.0 | 36.4 | 53.4 | 78.1 |
| | | | | | 52.8 | 78.5 |
| | | | | | | 78.2 |
| | Average | 42.77 | 50.0 | 42.77 | 52.95 | 78.44 |

**Slit: Low wall Opening Ratio: 0.50 Cavity Tilt Angle: -90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.2 | 45.5 | 44.1 | 50.0 | |
| | | 38.7 | 42.4 | 38.4 | 51.4 | |
| | | | 40.7 | 35.4 | 52.2 | |
| | | | | | 51.0 | |
| | Average | 39.45 | 42.87 | 39.30 | 51.15 | |
| Outer | Local | 36.2 | 44.2 | | 45.2 | 60.4 |
| | | 34.7 | 39.7 | 43.7 | 45.7 | 60.3 |
| | | | 37.4 | 36.8 | 46.0 | 59.7 |
| | | | | 33 | 45.9 | 60.1 |
| | | | | | | 60.5 |
| | Average | 35.45 | 40.43 | 37.83 | 45.7 | 60.2 |

**Slit: Low wall Opening Ratio: 0.50 Cavity Tilt Angle: -75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.3 | 44.7 | 44.0 | 51.8 | |
| | | 39.4 | 43.1 | 36.8 | 52.9 | |
| | | | 40.8 | 34.3 | 53.5 | |
| | | | | | 52.4 | |
| | Average | 39.85 | 42.87 | 38.37 | 52.65 | |
| Outer | Local | 36.5 | 44.1 | 43.5 | 46.5 | 60.1 |
| | | 34.7 | 39.8 | 36.2 | 46.8 | 60.3 |
| | | | 37.8 | 32.4 | 47.2 | 59.4 |
| | | | | | 46.8 | 59.5 |
| | | | | | | 59.9 |
| | Average | 35.60 | 40.57 | 37.37 | 46.83 | 59.84 |

**Slit: Low wall Opening Ratio: 0.50 Cavity Tilt Angle: -60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.6 | 48.0 | 44.1 | 50.6 | |
| | | 39.5 | 49.8 | 37.4 | 51.8 | |
| | | | 41.8 | 34.8 | 52.4 | |
| | | | | | 51.5 | |
| | Average | 40.05 | 43.87 | 38.77 | 51.58 | |
| Outer | Local | 37.1 | 45.8 | 43.5 | 46.2 | 60.7 |
| | | 35.5 | 41.2 | 36.7 | 46.8 | 60.6 |
| | | | 38.9 | 32.6 | 47.0 | 59.5 |
| | | | | | 46.5 | 60.3 |
| | | | | | | 60.3 |
| | Average | 36.30 | 41.96 | 37.6 | 46.63 | 60.28 |

**Slit: Low wall Opening Ratio: 0.50 Cavity Tilt Angle: -45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 41.3 | 45.7 | 43.0 | 51.9 | |
| | | 39.7 | 43.8 | 36.9 | 53.4 | |
| | | | 41.9 | 34.2 | 53.8 | |
| | | | | | 52.2 | |
| | Average | 40.50 | 43.80 | 38.03 | 52.83 | |
| Outer | Local | 37.2 | 46.0 | 42.8 | 47.2 | 61.2 |
| | | 35.5 | 41.4 | 36.2 | 47.4 | 61.5 |
| | | | 39.4 | 32.4 | 47.9 | 60.1 |
| | | | | | 47.3 | 61.0 |
| | | | | | | 61.1 |
| | Average | 36.35 | 42.27 | 37.13 | 47.58 | 61.0 |

**Slit: Low wall  Opening Ratio: 0.50  Cavity Tilt Angle: -30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | **Wall-1** | **Wall-2** | **Wall-3** | **Wall-4** | **Heater** |
| **Inner** | **Local** | 42.3 | 48.1 | 43.0 | 52.2 | |
| | | 40.4 | 45.1 | 37.1 | 53.4 | |
| | | | 42.7 | 33.7 | 53.6 | |
| | | | | | 52.4 | |
| | **Average** | 41.35 | 45.30 | 37.97 | 52.90 | |
| **Outer** | **Local** | 37.3 | 46.6 | 42.9 | 47.3 | 61.5 |
| | | 35.9 | 41.9 | 36.2 | 48.0 | 61.7 |
| | | | 39.2 | 32.5 | 48.0 | 61.0 |
| | | | | | 47.3 | 61.7 |
| | | | | | | 61.3 |
| | **Average** | 36.0 | 42.57 | 37.20 | 47.65 | 61.44 |

**Slit: Low wall  Opening Ratio: 0.50  Cavity Tilt Angle: -15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | **Wall-1** | **Wall-2** | **Wall-3** | **Wall-4** | **Heater** |
| **Inner** | **Local** | 42.8 | 50.2 | 43.5 | 52.2 | |
| | | 40.7 | 45.7 | 36.7 | 53.6 | |
| | | | 43.0 | 36.5 | 54.1 | |
| | | | | | 52.7 | |
| | **Average** | 41.75 | 46.30 | 38.90 | 53.15 | |
| **Outer** | **Local** | 37.4 | 46.7 | 43.2 | 47.8 | 63.1 |
| | | 36.0 | 42.0 | 36.0 | 48.5 | 63.4 |
| | | | 39.2 | 32.5 | 48.5 | 62.2 |
| | | | | | 47.7 | 62.5 |
| | | | | | | 62.5 |
| | **Average** | 36.70 | 42.63 | 37.23 | 48.13 | 62.74 |

**Slit: Low wall  Opening Ratio: 0.50  Cavity Tilt Angle: 0°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | **Wall-1** | **Wall-2** | **Wall-3** | **Wall-4** | **Heater** |
| **Inner** | **Local** | 45.3 | 53.2 | 43.5 | 53.2 | |
| | | 42.5 | 47.8 | 36.0 | 54.5 | |
| | | | 45.2 | 33.4 | 54.7 | |
| | | | | | 53.3 | |
| | **Average** | 43.90 | 48.73 | 37.63 | 53.93 | |
| **Outer** | **Local** | 38.8 | | 43.2 | 48.4 | 62.6 |
| | | 37.4 | 48.1 | 35.8 | 49.1 | 63.0 |
| | | | 43.4 | 32.2 | 49.1 | 61.5 |
| | | | 40.5 | | 48.2 | 62.0 |
| | | | | | | 62.0 |
| | **Average** | 38.10 | 44.0 | 37.07 | 48.70 | 62.22 |

**Slit: Low wall Opening Ratio: 0.50 Cavity Tilt Angle: 15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 45.5 | 55.0 | 43.6 | 54.6 | |
| | | 42.8 | 48.3 | 35.9 | 55.0 | |
| | | | 45.7 | 33.3 | 55.4 | |
| | | | | | 53.9 | |
| | Average | 44.15 | 49.67 | 37.6 | 54.70 | |
| Outer | Local | 38.8 | 48.1 | 43.4 | 49.3 | 64.2 |
| | | 37.6 | 43.5 | 35.0 | 49.3 | 64.3 |
| | | | 40.9 | 32.2 | 49.7 | 63.2 |
| | | | | | 48.7 | 63.5 |
| | | | | | | 63.1 |
| | Average | 38.20 | 44.17 | 37.06 | 49.25 | 63.66 |

**Slit: Low wall Opening Ratio: 0.50 Cavity Tilt Angle: 30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 47.3 | 58.6 | 44.5 | 53.4 | |
| | | 44.4 | 51.4 | 36.5 | 54.5 | |
| | | | 48.0 | 33.6 | 55.0 | |
| | | | | | 53.2 | |
| | Average | 45.85 | 52.69 | 38.20 | 54.03 | |
| Outer | Local | 40.2 | 49.8 | 43.4 | 48.9 | 65.9 |
| | | 38.5 | 45.4 | 35.9 | 49.5 | 66.1 |
| | | | 42.2 | 32.6 | 49.5 | 65.2 |
| | | | | | 48.5 | 65.4 |
| | | | | | | 64.8 |
| | Average | 39.35 | 45.80 | 37.30 | 49.10 | 65.48 |

**Slit: Low wall Opening Ratio; 0.50 Cavity Tilt Angle: 45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 46.7 | 58.7 | 46.1 | 54.4 | |
| | | 43.5 | 51.1 | 41.2 | 55.7 | |
| | | | 47.9 | 35.0 | 55.8 | |
| | | | | | 54.5 | |
| | Average | 45.10 | 52.57 | 40.77 | 55.10 | |
| Outer | Local | 40.0 | 49.7 | 40.1 | 49.6 | 67.2 |
| | | 38.0 | 45.4 | 36.1 | 50.0 | 67.1 |
| | | | 42.3 | 32.5 | 50.0 | 66.7 |
| | | | | | 49.1 | 660.9 |
| | | | | | | 66.8 |
| | Average | 39.0 | 45.8 | 37.57 | 49.68 | 66.94 |

**Slit: Low wall   Opening Ratio: 0.50   Cavity Tilt Angle: 60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 45.2 | 59.4 | 47.8 | 54.7 | |
| | | 42.0 | 51.5 | 68.3 | 56.1 | |
| | | | 48.0 | 35.9 | 56.6 | |
| | | | | | 54.9 | |
| | Average | 43.60 | 52.97 | 40.67 | 55.58 | |
| Outer | Local | 40.5 | 50.4 | 44.5 | 49.9 | 69.2 |
| | | 37.6 | 45.9 | 36.3 | 50.4 | 69.0 |
| | | | 42.7 | 32.7 | 50.4 | 68.5 |
| | | | | | 49.4 | 68.7 |
| | | | | | | 68.5 |
| | Average | 39.5 | 46.33 | 37.83 | 50.03 | 68.78 |

**Slit: Low wall   Opening Ratio: 0.50   Cavity Tilt Angle: 75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 43.0 | 58.6 | 49.3 | 58.0 | |
| | | 40.9 | 49.9 | 38.8 | 59.1 | |
| | | | 46.1 | 36.0 | 59.0 | |
| | | | | | 57.4 | |
| | Average | 41.95 | 51.53 | 41.37 | 58.38 | |
| Outer | Local | 39.7 | 50.8 | 46.5 | 52.1 | 69.8 |
| | | 36.6 | 46.2 | 36.5 | 52.3 | 70.0 |
| | | | 42.7 | 32.9 | 52.3 | 69.3 |
| | | | | | 51.3 | 69.8 |
| | | | | | | 69.5 |
| | Average | 38.15 | 46.57 | 38.63 | 52.0 | 69.68 |

**Slit: Low wall   Opening Ratio: 0.50   Cavity Tilt Angle: 90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 41.5 | 53.4 | 52.5 | 58.4 | |
| | | 40.2 | 47.2 | 41.2 | 59.6 | |
| | | | 44.7 | 38.8 | 60.0 | |
| | | | | | 58.4 | |
| | Average | 40.85 | 48.43 | 44.17 | 59.10 | |
| Outer | Local | 39.1 | 51.2 | 47.8 | 52.3 | 71.1 |
| | | 36.4 | 46.1 | 37.4 | 52.7 | 70.8 |
| | | | 42.6 | 33.7 | 52.7 | 70.7 |
| | | | | | 51.8 | 71.3 |
| | | | | | | 71.2 |
| | Average | 37.75 | 46.63 | 39.63 | 52.38 | 71.02 |

**Slit: Low wall    Opening Ratio: 0.75    Cavity Tilt Angle: -90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.1 | 42.0 | 41.7 | 45.9 | |
| | | | 38.4 | 36.7 | 46.8 | |
| | | | 36.8 | 34.7 | 47.5 | |
| | | | | | 46.9 | |
| | Average | 36.10 | 39.07 | 37.70 | 46.78 | |
| Outer | Local | 30.0 | 40.5 | 40.6 | 41.1 | 57.5 |
| | | | 36.2 | 34.7 | 41.1 | 57.7 |
| | | | 34.5 | 31.8 | 41.3 | 57.1 |
| | | | | | 41.7 | 57.9 |
| | | | | | | 58.0 |
| | Average | 30.0 | 37.07 | 35.70 | 41.38 | 57.64 |

**Slit: Low wall    Opening Ratio: 0.75    Cavity Tilt Angle: -75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 37.2 | 42.0 | 46.8 | 47.6 | |
| | | | 39.1 | 36.3 | 48.9 | |
| | | | 37.7 | 34.4 | 49.4 | |
| | | | | | 48.6 | |
| | Average | 37.2 | 39.5 | 37.50 | 48.63 | |
| Outer | Local | 34.2 | 41.5 | 41.5 | 42.8 | 58.2 |
| | | | 37.2 | 35.0 | 43.0 | 58.1 |
| | | | 35.4 | 31.7 | 43.2 | 57.6 |
| | | | | | 43.6 | 58.3 |
| | | | | | | 58.5 |
| | Average | 34.2 | 38.03 | 36.07 | 43.15 | 58.14 |

**Slit: Low wall    Opening Ratio: 0.75    Cavity Tilt Angle: -60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 38.2 | 44.4 | 43.6 | 46.1 | |
| | | | 41.0 | 36.2 | 47.7 | |
| | | | 39.0 | 35.2 | 48.3 | |
| | | | | | 47.4 | |
| | Average | 38.2 | 41.47 | 37.67 | 47.38 | |
| Outer | Local | 35.4 | 42.9 | 40.1 | 42.6 | 59.1 |
| | | | 38.5 | 35.1 | 43.0 | 59.2 |
| | | | 38.1 | 31.7 | 42.8 | 59.6 |
| | | | | | 43.0 | 59.2 |
| | | | | | | 59.3 |
| | Average | 35.4 | 39.83 | 35.63 | 42.85 | 59.28 |

**Slit: Low wall Opening Ratio: 0.75 Cavity Tilt Angle: -45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 39.4 | 44.0 | 39.6 | 50.6 | |
| | | | 42.3 | 35.2 | 51.7 | |
| | | | 40.2 | 33.1 | 52.1 | |
| | | | | | 51.0 | |
| | Average | 39.4 | 42.17 | 35.97 | 51.35 | |
| Outer | Local | 36.4 | 44.5 | 41.7 | 45.9 | 60.1 |
| | | | 39.9 | 34.7 | 46.5 | 60.3 |
| | | | 37.4 | 31.7 | 45.9 | 59.6 |
| | | | | | 45.7 | 60.0 |
| | | | | | | 60.3 |
| | Average | 36.4 | 40.60 | 36.03 | 46.00 | 60.06 |

**Slit: Low wall Opening Ratio: 0.75 Cavity Tilt Angle: -30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.5 | 46.0 | 37.8 | 51.8 | |
| | | | 42.2 | 35.2 | 52.8 | |
| | | | 41.5 | 32.4 | 53.2 | |
| | | | | | 51.7 | |
| | Average | 40.50 | 43.9 | 35.13 | 52.38 | |
| Outer | Local | 37.2 | 46.1 | 42.0 | 47.0 | 61.3 |
| | | | 41.1 | 34.7 | 47.6 | 61.8 |
| | | | 38.4 | 31.5 | 46.9 | 60.7 |
| | | | | | 46.6 | 61.9 |
| | | | | | | 61.5 |
| | Average | 37.20 | 41.87 | 36.07 | 47.03 | 61.44 |

**Slit: Low wall Opening Ratio: 0.75 Cavity Tilt Angle: -15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 41.4 | 46.9 | 38.6 | 54.2 | |
| | | | 44.3 | 35.5 | 55.3 | |
| | | | 41.9 | 33.1 | 55.3 | |
| | | | | | 53.6 | |
| | Average | 41.4 | 44.37 | 35.73 | 54.60 | |
| Outer | Local | 37.7 | 46.6 | 42.6 | 48.9 | 61.8 |
| | | | 41.7 | 35.2 | 49.5 | 62.3 |
| | | | 39.0 | 32.0 | 48.6 | 60.9 |
| | | | | | 48.1 | 62.2 |
| | | | | | | 61.9 |
| | Average | 37.7 | 42.43 | 36.60 | 48.78 | 61.82 |

**Slit: Low wall Opening Ratio: 0.75 Cavity Tilt Angle: 0°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 42.2 | 51.0 | 39.3 | 51.6 | |
| | | | 45.8 | 35.8 | 53.1 | |
| | | | 43.3 | 33.8 | 53.2 | |
| | | | | | 51.7 | |
| | Average | 42.2 | 46.70 | 36.30 | 52.40 | |
| Outer | Local | 38.7 | 47.4 | 41.8 | 47.5 | 63.8 |
| | | | 42.5 | 35.0 | 48.3 | 63.8 |
| | | | 39.7 | 32.0 | 47.5 | 62.1 |
| | | | | | 47.0 | 62.9 |
| | | | | | | 63.2 |
| | Average | 38.7 | 43.20 | 36.27 | 47.58 | 63.16 |

**Slit: Low wall Opening Ratio: 0.75 Cavity Tilt Angle: 15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 43.1 | 52.7 | 38.2 | 56.0 | |
| | | | 46.3 | 34.9 | 57.0 | |
| | | | 43.8 | 32.4 | 57.0 | |
| | | | | | 55.2 | |
| | Average | 43.1 | 47.60 | 35.17 | 56.30 | |
| Outer | Local | 38.0 | 47.5 | 43.6 | 50.8 | 63.0 |
| | | | 42.5 | 34.9 | 51.2 | 63.4 |
| | | | 39.5 | 31.8 | 50.3 | 63.0 |
| | | | | | 49.4 | 62.7 |
| | | | | | | 63.7 |
| | Average | 38.00 | 43.17 | 36.77 | 50.43 | 63.24 |

**Slit: Low wall Opening Ratio: 0.75 Cavity Tilt Angle: 30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 44.0 | 55.0 | 39.6 | 52.6 | |
| | | | 48.3 | 35.8 | 53.8 | |
| | | | 45.4 | 35.8 | 54.3 | |
| | | | | | 52.5 | |
| | Average | 44.00 | 49.57 | 36.40 | 53.30 | |
| Outer | Local | 39.0 | 48.5 | 42.3 | 48.5 | 66.4 |
| | | | 43.6 | 35.7 | 49.2 | 66.2 |
| | | | 40.5 | 32.3 | 48.3 | 65.1 |
| | | | | | 47.7 | 65.4 |
| | | | | | | 65.3 |
| | Average | 39.00 | 44.20 | 36.77 | 48.43 | 65.68 |

**Slit: Low wall Opening Ratio: 0.75 Cavity Tilt Angle: 45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 43.2 | 56.0 | 39.1 | 54.4 | |
| | | | 49.7 | 34.9 | 55.8 | |
| | | | 46.2 | 33.0 | 56.1 | |
| | | | | | 54.3 | |
| | Average | 43.20 | 50.63 | 35.67 | 55.15 | |
| Outer | Local | 39.1 | 49.1 | 42.8 | 49.8 | 65.8 |
| | | | 44.4 | 34.8 | 50.3 | 66.0 |
| | | | 41.0 | 32.0 | 49.2 | 65.1 |
| | | | | | 48.8 | 65.6 |
| | | | | | | 65.3 |
| | Average | 39.10 | 44.83 | 36.53 | 49.53 | 65.56 |

**Slit: Low wall Opening Ratio: 0.75 Cavity Tilt Angle: 60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 42.1 | 57.2 | 42.7 | 55.8 | |
| | | | 49.8 | 35.8 | 57.1 | |
| | | | 46.2 | 33.0 | 57.3 | |
| | | | | | 55.4 | |
| | Average | 42.10 | 51.07 | 37.17 | 56.40 | |
| Outer | Local | 38.7 | 49.9 | 43.6 | 50.6 | 68.1 |
| | | | 45.2 | 35.0 | 51.0 | 68.2 |
| | | | 41.7 | 31.8 | 50.3 | 67.8 |
| | | | | | 49.4 | 67.9 |
| | | | | | | 67.5 |
| | Average | 38.70 | 45.60 | 36.80 | 50.33 | 67.90 |

**Slit: Low wall Opening Ratio: 0.75 Cavity Tilt Angle: 75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.8 | 57.6 | 47.1 | 55.8 | |
| | | | 48.8 | 38.6 | 57.5 | |
| | | | 44.7 | 34.7 | 57.7 | |
| | | | | | 55.9 | |
| | Average | 40.80 | 50.37 | 40.13 | 56.73 | |
| Outer | Local | 38.0 | 50.9 | 45.0 | 50.8 | 70.6 |
| | | | 45.4 | 35.8 | 51.6 | 70.8 |
| | | | 41.5 | 32.8 | 51.2 | 69.1 |
| | | | | | 50.2 | 70.3 |
| | | | | | | 70.1 |
| | Average | 38.00 | 45.93 | 37.87 | 50.95 | 70.18 |

**Slit: Low wall    Opening Ratio: 0.75    Cavity Tilt Angle: 90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 39.5 | 53.6 | 52.1 | 57.4 | |
| | | | 46.4 | 47.0 | 58.0 | |
| | | | 43.2 | 37.7 | 55.2 | |
| | | | | | 57.2 | |
| | Average | 39.50 | 47.73 | 45.60 | 56.95 | |
| Outer | Local | 37.3 | 51.0 | 47.1 | 51.6 | 71.6 |
| | | | 44.9 | 36.7 | 52.2 | 71.6 |
| | | | 40.9 | 38.1 | 52.0 | 71.5 |
| | | | | | 51.0 | 72.3 |
| | | | | | | 72.3 |
| | Average | 37.30 | 45.60 | 38.96 | 51.70 | 71.86 |

**Slit: High wall    Opening Ratio: 0.25    Cavity Tilt Angle: -90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.9 | 45.4 | 45.5 | 49.4 | |
| | | 41.3 | 42.7 | 39.1 | 51.0 | |
| | | 38.5 | 41.1 | 34.6 | 51.6 | |
| | | | | | 50.8 | |
| | Average | 40.23 | 43.07 | 39.73 | 50.70 | |
| Outer | Local | 37.7 | 44.4 | 44.0 | 44.9 | 62.0 |
| | | 37.8 | 40.2 | 37.2 | 45.1 | 62.1 |
| | | 36.0 | 38.1 | 33.4 | 45.8 | 62.1 |
| | | | | | 45.8 | 62.1 |
| | | | | | | 62.2 |
| | Average | 37.17 | 40.90 | 38.20 | 46.08 | 62.08 |

**Slit: High wall    Opening Ratio: 0.25    Cavity Tilt Angle: -75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40-1 | 45.2 | 47.0 | 50.7 | |
| | | 41.8 | 43.1 | 40.0 | 51.8 | |
| | | 40.1 | 41.8 | 34.9 | 52.6 | |
| | | | | | 51.9 | |
| | Average | 40.67 | 43.37 | 40.63 | 51.75 | |
| Outer | Local | 37.9 | 45.2 | 44.7 | 45.7 | 62.9 |
| | | 38.5 | 40.6 | 37.8 | 45.9 | 62.7 |
| | | 36.5 | 38.5 | 33.7 | 46.7 | 61.8 |
| | | | | | 46.6 | 62.2 |
| | | | | | | 62.6 |
| | Average | 37.63 | 41.43 | 38.73 | 46.23 | 62.44 |

**Slit: High wall Opening Ratio: 0.25 Cavity Tilt Angle: -60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.8 | 46.1 | 47.1 | 51.8 | |
| | | 41.6 | 42.9 | 41.1 | 53.2 | |
| | | 40.2 | 42.1 | 34.6 | 53.9 | |
| | | | | | 53.3 | |
| | Average | 40.87 | 43.70 | 41.03 | 53.05 | |
| Outer | Local | 38.0 | 45.6 | 45.8 | 47.0 | 63.0 |
| | | 38.8 | 41.0 | 38.5 | 47.4 | 62.7 |
| | | 37.2 | 38.8 | 35.1 | 48.0 | 62.6 |
| | | | | | 47.8 | 62.7 |
| | | | | | | 62.9 |
| | Average | 38.0 | 41.80 | 39.80 | 47.55 | 62.58 |

**Slit: High wall Opening Ratio: 0.25 Cavity Tilt Angle: -45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 41.0 | 45.0 | 50.0 | 52.7 | |
| | | 41.9 | 43.2 | 43.5 | 54.0 | |
| | | 40.4 | 42.2 | 42.3 | 54.9 | |
| | | | | | 54.0 | |
| | Average | 41.10 | 43.47 | 45.27 | 53.90 | |
| Outer | Local | 37.9 | 45.9 | 46.8 | 47.6 | 63.6 |
| | | 38.8 | 41.1 | 39.3 | 48.2 | 63.5 |
| | | 37.5 | 38.8 | 34.9 | 48.8 | 63.7 |
| | | | | | 48.5 | 64.0 |
| | | | | | | 64.1 |
| | Average | 38.07 | 41.93 | 40.33 | 48.28 | 63.78 |

**Slit: High wall Opening Ratio: 0.25 Cavity Tilt Angle: -30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 41.1 | 45.1 | 51.9 | 53.1 | |
| | | 41.9 | 43.1 | 45.0 | 54.6 | |
| | | 40.5 | 42.2 | 43.8 | 55.6 | |
| | | | | | 54.8 | |
| | Average | 41.17 | 43.47 | 46.90 | 54.53 | |
| Outer | Local | 38.0 | 46.1 | 47.9 | 48.0 | 64.6 |
| | | 38.9 | 41.2 | 40.4 | 48.8 | 64.6 |
| | | 37.4 | 38.9 | 36.4 | 49.4 | 64.1 |
| | | | | | 49.1 | 64.7 |
| | | | | | | 65.3 |
| | Average | 38.10 | 42.07 | 41.57 | 48.83 | 64.66 |

**Slit: High wall  Opening Ratio: 0.25  Cavity Tilt Angle: -15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.8 | 44.6 | 53.0 | 53.8 | |
| | | 41.9 | 42.8 | 46.7 | 55.4 | |
| | | 39.6 | 41.3 | 45.4 | 56.4 | |
| | | | | | 55.5 | |
| | Average | 39.87 | 42.90 | 48.37 | 55.28 | |
| Outer | Local | 38.0 | 45.5 | 49.2 | 48.7 | 65.2 |
| | | 38.7 | 40.4 | 42.0 | 49.5 | 65.3 |
| | | 37.0 | 38.7 | 38.5 | 50.2 | 65.0 |
| | | | | | 50.1 | 65.9 |
| | | | | | | 66.1 |
| | Average | 37.90 | 41.53 | 43.23 | 49.63 | 65.50 |

**Slit: High wall  Opening Ratio: 0.25  Cavity Tilt Angle: 0°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.6 | 43.0 | 54.3 | 54.3 | |
| | | 41.6 | 42.6 | 48.1 | 56.1 | |
| | | 39.0 | 41.4 | 45.1 | 57.2 | |
| | | | | | 56.5 | |
| | Average | 40.40 | 43.00 | 49.17 | 56.03 | |
| Outer | Local | 38.0 | 46.0 | 49.8 | 49.3 | 65.9 |
| | | 38.9 | 40.5 | 43.2 | 50.3 | 65.7 |
| | | 36.2 | 38.5 | 39.6 | 51.0 | 65.6 |
| | | | | | 50.9 | 66.5 |
| | | | | | | 67.0 |
| | Average | 37.70 | 41.67 | 44.2 | 50.38 | 66.14 |

**Slit: High wall  Opening Ratio: 0.25  Cavity Tilt Angle: 15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 39.8 | 44.1 | 54.6 | 55.2 | |
| | | 41.3 | 42.2 | 48.5 | 57.2 | |
| | | 39.8 | 41.0 | 46.4 | 58.2 | |
| | | | | | 57.3 | |
| | Average | 40.30 | 42.43 | 49.83 | 56.98 | |
| Outer | Local | 37.7 | 46.2 | 50.8 | 49.7 | 66.4 |
| | | 38.6 | 39.8 | 44.1 | 50.8 | 65.8 |
| | | 37.8 | 37.7 | 41.2 | 51.9 | 65.8 |
| | | | | | 51.7 | 66.9 |
| | | | | | | 67.0 |
| | Average | 38.03 | 41.23 | 45.37 | 51.03 | 66.38 |

Slit: High wall Opening Ratio: 0.25 Cavity Tilt Angle: 30°

| Surface | Temperature(°C) | | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.0 | 45.0 | 56.1 | 56.1 | |
| | | 41.4 | 42.6 | 49.7 | 58.2 | |
| | | 39.8 | 41.4 | 47.2 | 59.0 | |
| | | | | | 58.3 | |
| | Average | 40.40 | 43.00 | 51.97 | 57.90 | |
| Outer | Local | 38.3 | 47.2 | 52.1 | 50.6 | 67.2 |
| | | 39.1 | 41.0 | 45.2 | 52.1 | 67.3 |
| | | 37.6 | 38.7 | 42.3 | 53.3 | 67.4 |
| | | | | | 53.1 | 68.2 |
| | | | | | | 68.2 |
| | Average | 38.33 | 42.30 | 46.53 | 52.28 | 67.66 |

Slit: High wall Opening Ratio: 0.25 Cavity Tilt Angle: 45°

| Surface | Temperature(°C) | | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.6 | 46.7 | 58.3 | 56.7 | |
| | | 41.5 | 43.6 | 51.6 | 58.6 | |
| | | 39.7 | 42.3 | 48.1 | 60.0 | |
| | | | | | 59.2 | |
| | Average | 40.60 | 44.20 | 52.67 | 58.63 | |
| Outer | Local | 37.8 | 47.9 | 53.0 | 51.1 | 69.4 |
| | | 38.7 | 41.6 | 46.2 | 52.7 | 69.1 |
| | | 37.9 | 39.0 | 42.8 | 53.9 | 69.2 |
| | | | | | 53.7 | 70.7 |
| | | | | | | 70.6 |
| | Average | 38.13 | 42.83 | 47.33 | 53.10 | 69.80 |

Slit: High wall Opening Ratio: 0.25 Cavity Tilt Angle: 60°

| Surface | Temperature(°C) | | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 41.3 | 48.0 | 59.9 | 58.2 | |
| | | 42.2 | 44.4 | 52.4 | 60.3 | |
| | | 40.8 | 43.0 | 47.4 | 61.6 | |
| | | | | | 60.7 | |
| | Average | 41.43 | 45.13 | 53.23 | 60.20 | |
| Outer | Local | 38.1 | 48.5 | 54.2 | 52.4 | 71.5 |
| | | 39.1 | 41.9 | 47.1 | 54.0 | 71.5 |
| | | 39.0 | 39.3 | 42.1 | 55.1 | 71.5 |
| | | | | | 54.8 | 72.4 |
| | | | | | | 72.4 |
| | Average | 38.73 | 43.23 | 47.80 | 54.08 | 71.86 |

Slit: High wall Opening Ratio: 0.25 Cavity Tilt Angle: 75°

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 42.2 | 52.8 | 60.7 | 59.0 | |
| | | 43.1 | 45.7 | 51.6 | 61.2 | |
| | | 42.5 | 43.8 | 44.7 | 62.4 | |
| | | | | | 61.8 | |
| | Average | 42.60 | 47.43 | 52.33 | 61.10 | |
| Outer | Local | 38.1 | 49.4 | 55.2 | 53.2 | 74.0 |
| | | 39.3 | 50.4 | 47.3 | 54.7 | 74.1 |
| | | 39.1 | 39.6 | 40.7 | 56.0 | 74.1 |
| | | | | | 56.8 | 74.6 |
| | | | | | | 74.5 |
| | Average | 38.83 | 46.47 | 47.73 | 55.18 | 74.26 |

Slit: High wall Opening Ratio: 0.25 Cavity Tilt Angle: 90°

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 43.1 | 58.2 | 59.2 | 56.7 | |
| | | 44.2 | 48.1 | 49.8 | 59.0 | |
| | | 42.7 | 45.4 | 43.8 | 60.2 | |
| | | | | | 59.8 | |
| | Average | 43.33 | 50.57 | 50.93 | 58.93 | |
| Outer | Local | 38.6 | 50.4 | 43.7 | 51.3 | 76.0 |
| | | 39.8 | 43.2 | 46.7 | 53.0 | 76.2 |
| | | 38.7 | 40.1 | 40.7 | 54.5 | 75.8 |
| | | | | | 54.2 | 76.5 |
| | | | | | | 76.4 |
| | Average | 39.03 | 44.57 | 43.70 | 53.25 | 76.18 |

Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: -90°

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 39.7 | 43.1 | 43.9 | 50.3 | |
| | | 38.5 | 41.3 | 38.0 | 51.3 | |
| | | | 40.0 | 36.7 | 52.0 | |
| | | | | | 51.3 | |
| | Average | 39.10 | 41.47 | 39.53 | 51.23 | |
| Outer | Local | 36.2 | 43.9 | 43.5 | 45.2 | 60.4 |
| | | 35.2 | 39.4 | 36.5 | 45.4 | 59.9 |
| | | | 37.4 | 33.1 | 46.1 | 59.8 |
| | | | | | 46.1 | 61.2 |
| | | | | | | 60.6 |
| | Average | 35.70 | 40.23 | 37.70 | 45.70 | 60.38 |

**Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: -75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 40.4 | 43.8 | 44.7 | 49.6 | |
| | | 39.1 | 41.7 | 39.2 | 51.0 | |
| | | | 40.4 | 36.8 | 51.8 | |
| | | | | | 51.3 | |
| | Average | 39.75 | 41.97 | 40.23 | 50.93 | |
| Outer | Local | 36.5 | 44.2 | 43.6 | 45.1 | 61.0 |
| | | 35.4 | 39.8 | 37.2 | 45.5 | 60.4 |
| | | | 37.8 | 33.6 | 46.3 | 60.6 |
| | | | | | 46.1 | 61.4 |
| | | | | | | 61.1 |
| | Average | 35.95 | 40.60 | 38.13 | 45.75 | 60.90 |

**Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: -60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 39.6 | 43.2 | 46.3 | 51.2 | |
| | | 39.2 | 41.4 | 40.5 | 52.0 | |
| | | | 40.2 | 38.7 | 52.7 | |
| | | | | | 52.1 | |
| | Average | 39.40 | 41.60 | 41.83 | 52.00 | |
| Outer | Local | 36.5 | 44.4 | 44.5 | 45.8 | 61.4 |
| | | 35.3 | 39.8 | 37.5 | 46.4 | 61.4 |
| | | | 37.8 | 34.2 | 47.1 | 61.7 |
| | | | | | 46.9 | 61.2 |
| | | | | | | 61.7 |
| | Average | 35.90 | 40.67 | 38.73 | 46.55 | 61.48 |

**Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: -45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 39.2 | 43.0 | 46.8 | 51.7 | |
| | | 38.9 | 41.2 | 44.2 | 52.5 | |
| | | | 40.2 | 40.4 | 53.4 | |
| | | | | | 52.6 | |
| | Average | 39.05 | 41.47 | 43.80 | 52.55 | |
| Outer | Local | 36.4 | 44.5 | 45.2 | 46.4 | 62.1 |
| | | 35.4 | 40.0 | 38.4 | 47.1 | 61.0 |
| | | | 38.0 | 35.1 | 47.8 | 61.2 |
| | | | | | 47.5 | 62.0 |
| | | | | | | 62.3 |
| | Average | 35.90 | 40.83 | 39.57 | 47.20 | 61.72 |

**Slit: High wall   Opening Ratio: 0.50   Cavity Tilt Angle: -30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 38.5 | 42.0 | 48.9 | 51.6 | |
| | | 38.5 | 40.8 | 42.8 | 52.7 | |
| | | | 39.8 | 41.6 | 53.3 | |
| | | | | | 52.8 | |
| | Average | 38.5 | 40.87 | 44.43 | 52.60 | |
| Outer | Local | 36.4 | 44.8 | 45.6 | 46.3 | 62.5 |
| | | 35.3 | 39.9 | 99.2 | 47.1 | 61.5 |
| | | | 37.9 | 35.9 | 47.8 | 61.6 |
| | | | | | 47.5 | 62.3 |
| | | | | | | 62.8 |
| | Average | 35.85 | 40.87 | 40.23 | 47.18 | 62.14 |

**Slit: High wall   Opening Ratio: 0.50   Cavity Tilt Angle: -15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 37.5 | 40.0 | 49.2 | 52.0 | |
| | | 37.3 | 39.5 | 43.4 | 53.6 | |
| | | | 39.2 | 41.5 | 54.6 | |
| | | | | | 53.5 | |
| | Average | 37.40 | 39.57 | 44.70 | 53.43 | |
| Outer | Local | 35.8 | 44.4 | 46.6 | 47.1 | 62.2 |
| | | 35.3 | 39.4 | 39.8 | 48.1 | 60.8 |
| | | | 37.3 | 36.6 | 48.8 | 61.8 |
| | | | | | 48.5 | 62.7 |
| | | | | | | 62.8 |
| | Average | 35.55 | 40.36 | 41.00 | 48.13 | 62.06 |

**Slit: High wall   Opening Ratio: 0.50   Cavity Tilt Angle: 0°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 37.2 | 39.2 | 50.0 | 52.0 | |
| | | 37.5 | 38.7 | 44.1 | 54.2 | |
| | | | 38.0 | 41.6 | 55.0 | |
| | | | | | 54.4 | |
| | Average | 37.35 | 38.63 | 45.23 | 53.90 | |
| Outer | Local | 36.1 | 43.9 | 47.3 | 47.5 | 62.5 |
| | | 35.0 | 38.7 | 40.5 | 48.6 | 61.2 |
| | | | 36.8 | 37.4 | 49.4 | 62.4 |
| | | | | | 49.1 | 63.2 |
| | | | | | | 63.5 |
| | Average | 35.55 | 39.80 | 41.73 | 48.65 | 62.56 |

**Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: 15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.9 | 40.1 | 51.3 | 52.5 | |
| | | 37.4 | 38.9 | 44.6 | 54.4 | |
| | | | 38.1 | 42.5 | 55.5 | |
| | | | | | 54.8 | |
| | Average | 37.15 | 39.03 | 46.13 | 54.30 | |
| Outer | Local | 35.7 | 43.8 | 48.0 | 47.9 | 62.8 |
| | | 34.8 | 38.3 | 41.6 | 49.2 | 61.3 |
| | | | 36.6 | 38.1 | 50.0 | 62.5 |
| | | | | | 49.6 | 63.4 |
| | | | | | | 63.8 |
| | Average | 35.25 | 39.56 | 42.57 | 49.18 | 62.76 |

**Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: 30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.7 | 40.5 | 52.0 | 53.5 | |
| | | 37.2 | 39.4 | 45.7 | 55.6 | |
| | | | 38.3 | 43.2 | 56.7 | |
| | | | | | 55.6 | |
| | Average | 36.95 | 39.40 | 46.97 | 55.35 | |
| Outer | Local | 35.5 | 44.2 | 49.0 | 48.6 | 63.6 |
| | | 34.6 | 38.5 | 41.8 | 49.9 | 64.2 |
| | | | 36.5 | 38.6 | 50.9 | 63.1 |
| | | | | | 50.4 | 64.3 |
| | | | | | | 64.7 |
| | Average | 35.05 | 39.73 | 43.13 | 49.95 | 63.98 |

**Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: 45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.4 | 40.4 | 53.9 | 53.6 | |
| | | 37.1 | 39.4 | 47.0 | 55.7 | |
| | | | 38.4 | 44.4 | 56.6 | |
| | | | | | 55.9 | |
| | Average | 36.75 | 39.40 | 48.43 | 55.45 | |
| Outer | Local | 36.6 | 44.5 | 49.4 | 48.7 | 64.5 |
| | | 34.6 | 38.7 | 42.6 | 50.2 | 64.4 |
| | | | 36.5 | 39.5 | 51.1 | 64.2 |
| | | | | | 50.8 | 65.4 |
| | | | | | | 65.7 |
| | Average | 35.60 | 39.90 | 43.83 | 50.20 | 64.84 |

**Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: 60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.7 | 41.8 | 54.7 | 53.2 | |
| | | 37.0 | 39.7 | 47.6 | 55.5 | |
| | | | 38.5 | 43.5 | 56.7 | |
| | | | | | 56.1 | |
| | Average | 36.85 | 40.00 | 48.60 | 55.38 | |
| Outer | Local | 35.3 | 45.0 | 49.7 | 48.7 | 65.6 |
| | | 34.7 | 38.8 | 42.8 | 50.2 | 65.1 |
| | | | 36.7 | 39.0 | 51.2 | 65.3 |
| | | | | | 50.8 | 66.3 |
| | | | | | | 66.6 |
| | Average | 35.00 | 40.17 | 43.83 | 50.23 | 65.78 |

**Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: 75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 37.2 | 46.5 | 55.2 | 54.3 | |
| | | 37.0 | 40.6 | 46.0 | 56.5 | |
| | | | 39.3 | 39.3 | 57.6 | |
| | | | | | 56.9 | |
| | Average | 37.10 | 42.13 | 46.83 | 56.33 | |
| Outer | Local | 35.1 | 45.5 | 50.4 | 49.4 | 67.3 |
| | | 34.5 | 39.0 | 43.4 | 50.8 | 67.1 |
| | | | 36.6 | 38.1 | 52.0 | 66.8 |
| | | | | | 51.6 | 68.0 |
| | | | | | | 68.0 |
| | Average | 34.80 | 40.37 | 43.97 | 50.95 | 67.44 |

**Slit: High wall Opening Ratio: 0.50 Cavity Tilt Angle: 90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 37.6 | 52.4 | 53.4 | 54.3 | |
| | | 37.5 | 42.3 | 44.5 | 56.1 | |
| | | | 39.9 | 39.1 | 57.4 | |
| | | | | | 56.5 | |
| | Average | 37.55 | 44.87 | 45.67 | 56.08 | |
| Outer | Local | 35.1 | 46.1 | 50.1 | 49.2 | 69.5 |
| | | 32.5 | 39.1 | 43.1 | 50.6 | 69.2 |
| | | | 36.3 | 37.3 | 51.7 | 68.9 |
| | | | | | 51.4 | 69.6 |
| | | | | | | 69.7 |
| | Average | 33.80 | 40.50 | 43.50 | 50.73 | 69.38 |

**Slit: High wall Opening Ratio: 0.75 Cavity Tilt Angle: -90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 39.4 | 42.0 | 44.0 | 48.8 | |
| | | | 40.3 | 38.8 | 50.1 | |
| | | | 36.7 | 36.0 | 50.8 | |
| | | | | | 50.4 | |
| | Average | 39.40 | 40.33 | 39.60 | 50.15 | |
| Outer | Local | 36.0 | 43.2 | 43.2 | 44.1 | 59.5 |
| | | | 38.3 | 36.8 | 44.1 | 59.2 |
| | | | 36.5 | 33.7 | 44.3 | 58.6 |
| | | | | | 44.8 | 60.0 |
| | | | | | | 60.2 |
| | Average | 36.00 | 39.33 | 37.90 | 44.33 | 59.50 |

**Slit: High wall Opening Ratio: 0.75 Cavity Tilt Angle: -75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 38.0 | 42.1 | 45.0 | 49.5 | |
| | | | 39.7 | 39.0 | 50.8 | |
| | | | 38.6 | 36.5 | 51.5 | |
| | | | | | 51.0 | |
| | Average | 38.00 | 40.13 | 40.17 | 50.70 | |
| Outer | Local | 36.0 | 43.5 | 43.9 | 44.8 | 60.0 |
| | | | 38.7 | 37.1 | 45.1 | 59.5 |
| | | | 36.7 | 34.4 | 45.8 | 59.3 |
| | | | | | 45.8 | 60.1 |
| | | | | | | 60.3 |
| | Average | 36.00 | 39.63 | 38.47 | 45.38 | 59.84 |

**Slit: High wall Opening Ratio: 0.75 Cavity Tilt Angle: -60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 38.4 | 41.0 | 46.2 | 49.7 | |
| | | | 39.3 | 40.6 | 51.2 | |
| | | | 38.5 | 37.7 | 52.1 | |
| | | | | | 51.4 | |
| | Average | 38.40 | 39.60 | 41.50 | 51.10 | |
| Outer | Local | 36.0 | 44.0 | 44.4 | 45.3 | 60.4 |
| | | | 39.0 | 37.5 | 45.7 | 60.3 |
| | | | 36.9 | 34.1 | 46.5 | 59.7 |
| | | | | | 46.4 | 60.4 |
| | | | | | | 60.7 |
| | Average | 36.00 | 39.96 | 38.67 | 45.98 | 60.30 |

**Slit: High wall    Opening Ratio: 0.75    Cavity Tilt Angle: -45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 37.3 | 39.5 | 47.0 | 52.2 | |
| | | | 38.5 | 40.9 | 53.3 | |
| | | | 38.1 | 38.6 | 54.0 | |
| | | | | | 53.3 | |
| | Average | 39.30 | 38.70 | 42.17 | 53.20 | |
| Outer | Local | 35.6 | 43.8 | 45.8 | 46.9 | 60.6 |
| | | | 38.9 | 38.2 | 47.4 | 60.6 |
| | | | 36.4 | 35.0 | 48.1 | 60.1 |
| | | | | | 47.8 | 60.8 |
| | | | | | | 60.9 |
| | Average | 35.60 | 39.87 | 39.67 | 47.55 | 60.60 |

**Slit: High wall    Opening Ratio: 0.75    Cavity Tilt Angle: -30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.6 | 39.0 | 48.1 | 52.2 | |
| | | | 38.0 | 42.0 | 53.6 | |
| | | | 38.0 | 40.0 | 54.4 | |
| | | | | | 53.6 | |
| | Average | 36.60 | 38.33 | 43.37 | 53.45 | |
| Outer | Local | 35.6 | 43.8 | 46.6 | 47.7 | 61.0 |
| | | | 38.8 | 39.1 | 48.1 | 61.0 |
| | | | 36.8 | 35.8 | 48.8 | 60.6 |
| | | | | | 48.5 | 61.5 |
| | | | | | | 61.7 |
| | Average | 35.60 | 39.8 | 40.50 | 48.28 | 61.16 |

**Slit: High wall    Opening Ratio: 0.75    Cavity Tilt Angle: -15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.6 | 38.2 | 48.1 | 52.2 | |
| | | | 38.0 | 42.5 | 53.8 | |
| | | | 37.9 | 40.3 | 54.5 | |
| | | | | | 59.8 | |
| | Average | 36.60 | 38.03 | 43.97 | 53.58 | |
| Outer | Local | 35.7 | 43.9 | 46.7 | 47.3 | 64.4 |
| | | | 38.6 | 39.6 | 48.2 | 61.3 |
| | | | 36.7 | 36.2 | 49.1 | 61.1 |
| | | | | | 48.6 | 62.1 |
| | | | | | | 62.3 |
| | Average | 35.70 | 39.73 | 40.63 | 48.30 | 61.64 |

**Slit: High wall    Opening Ratio: 0.75    Cavity Tilt Angle: 0°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 35.9 | 38.0 | 49.5 | 51.7 | |
| | | | 37.7 | 43.4 | 53.4 | |
| | | | 37.6 | 41.4 | 54.4 | |
| | | | | | 53.8 | |
| | Average | 35.90 | 37.77 | 44.77 | 53.33 | |
| Outer | Local | 34.8 | 43.7 | 46.4 | 47.1 | 61.8 |
| | | | 38.1 | 40.0 | 48.1 | 61.5 |
| | | | 36.3 | 36.8 | 49.1 | 62.5 |
| | | | | | 48.7 | 62.4 |
| | | | | | | 62.7 |
| | Average | 34.80 | 39.37 | 41.07 | 48.25 | 61.98 |

**Slit: High wall    Opening Ratio: 0.75    Cavity Tilt Angle: 15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 35.5 | 39.0 | 50.5 | 52.0 | |
| | | | 37.5 | 43.8 | 54.0 | |
| | | | 37.4 | 42.1 | 55.0 | |
| | | | | | 54.2 | |
| | Average | 35.50 | 37.97 | 45.47 | 53.80 | |
| Outer | Local | 35.0 | 43.5 | 47.3 | 47.5 | 62.0 |
| | | | 37.6 | 40.4 | 48.6 | 62.0 |
| | | | 35.9 | 37.2 | 49.5 | 61.7 |
| | | | | | 49.1 | 62.6 |
| | | | | | | 62.8 |
| | Average | 35.00 | 39.00 | 41.63 | 48.68 | 62.22 |

**Slit: High wall    Opening Ratio: 0.75    Cavity Tilt Angle: 30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.0 | 37.3 | 51.1 | 52.2 | |
| | | | 37.2 | 44.5 | 54.3 | |
| | | | 37.2 | 41.7 | 55.3 | |
| | | | | | 54.5 | |
| | Average | 36.00 | 37.23 | 45.77 | 54.08 | |
| Outer | Local | 35 | 43.4 | 47.8 | 47.6 | 62.4 |
| | | | 37.2 | 41.1 | 48.8 | 62.7 |
| | | | 35.4 | 37.6 | 49.8 | 62.1 |
| | | | | | 49.5 | 63.2 |
| | | | | | | 65.5 |
| | Average | 35.00 | 38.67 | 42.17 | 48.93 | 62.78 |

**Slit: High wall** **Opening Ratio: 0.75** **Cavity Tilt Angle: 45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 35.6 | 39.0 | 52.8 | 53.0 | |
| | | | 37.4 | 45.9 | 55.2 | |
| | | | 37.5 | 44.1 | 56.3 | |
| | | | | | 55.5 | |
| | Average | 35.60 | 37.97 | 47.60 | 55.00 | |
| Outer | Local | 34.7 | 43.7 | 48.9 | 48.3 | 63.1 |
| | | | 37.6 | 42.0 | 49.6 | 62.6 |
| | | | 35.5 | 38.6 | 50.6 | 62.9 |
| | | | | | 50.3 | 64.2 |
| | | | | | | 64.6 |
| | Average | 34.70 | 38.93 | 43.17 | 49.70 | 63.48 |

**Slit: High wall** **Opening Ratio: 0.75** **Cavity Tilt Angle: 60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 35.3 | 39.8 | 54.4 | 53.7 | |
| | | | 38.0 | 46.9 | 55.8 | |
| | | | 37.7 | 44.8 | 56.7 | |
| | | | | | 56.2 | |
| | Average | 35.30 | 38.50 | 48.70 | 55.60 | |
| Outer | Local | 34.8 | 44.3 | 49.6 | 48.8 | 64.9 |
| | | | 37.9 | 42.9 | 50.2 | 64.2 |
| | | | 35.9 | 39.1 | 51.2 | 64.8 |
| | | | | | 50.8 | 65.8 |
| | | | | | | 66.1 |
| | Average | 34.80 | 39.37 | 43.87 | 50.25 | 65.16 |

**Slit: High wall** **Opening Ratio: 0.75** **Cavity Tilt Angle: 75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 35.9 | 44.2 | 54.7 | 54.2 | |
| | | | 38.7 | 45.4 | 56.2 | |
| | | | 37.8 | 41.9 | 57.5 | |
| | | | | | 56.7 | |
| | Average | 35.90 | 40.23 | 47.17 | 56.15 | |
| Outer | Local | 34.8 | 44.7 | 50.3 | 49.2 | 66.6 |
| | | | 38.1 | 43.2 | 50.5 | 66.2 |
| | | | 35.8 | 38.3 | 51.5 | 66.0 |
| | | | | | 51.2 | 67.2 |
| | | | | | | 67.4 |
| | Average | 34.80 | 39.53 | 43.93 | 50.60 | 66.68 |

**Slit: High wall  Opening Ratio: 0.75  Cavity Tilt Angle: 90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.3 | 51.4 | 51.8 | 55.1 | |
| | | | 41.1 | 43.1 | 57.0 | |
| | | | 38.7 | 39.8 | 58.1 | |
| | | | | | 57.5 | |
| | Average | 36.30 | 43.73 | 44.90 | 56.93 | |
| Outer | Local | 34.8 | 45.7 | 50.5 | 49.8 | 68.6 |
| | | | 38.7 | 42.7 | 51.1 | 69.4 |
| | | | 36.1 | 37.2 | 52.1 | 68.0 |
| | | | | | 51.8 | 67.0 |
| | | | | | | 68.8 |
| | Average | 34.80 | 40.17 | 43.47 | 51.20 | 68.36 |

**Slit: Uniform  Opening Ratio: 0.25  Cavity Tilt Angle: -90°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.9 | 43.3 | 43.4 | 44.2 | |
| | | 37.5 | 39.6 | 38.8 | 45.1 | |
| | | 36.2 | 35.2 | 31.6 | 46.1 | |
| | | | | | 45.8 | |
| | Average | 36.87 | 39.37 | 37.93 | 45.30 | |
| Outer | Local | 32.9 | 40.3 | 41.9 | 39.4 | 60.4 |
| | | 32.5 | 34.3 | 36.8 | 39.0 | 60.0 |
| | | 31.7 | 31.8 | 33.3 | 39.9 | 59.6 |
| | | | | | 40.7 | 60.2 |
| | | | | | | 60.0 |
| | Average | 32.37 | 35.47 | 37.33 | 39.75 | 60.04 |

**Slit: Uniform  Opening Ratio: 0.25  Cavity Tilt Angle: -75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 35.0 | 46.3 | 43.3 | 46.1 | |
| | | 36.7 | 40.8 | 37.4 | 47.3 | |
| | | 37.6 | 38.4 | 34.5 | 48.1 | |
| | | | | | 47.6 | |
| | Average | 36.43 | 41.83 | 38.40 | 47.28 | |
| Outer | Local | 31.9 | 41.2 | 42.7 | 41.4 | 60.7 |
| | | 32.0 | 35.3 | 37.4 | 40.1 | 60.4 |
| | | 32.3 | 32.8 | 33.0 | 41.9 | 59.9 |
| | | | | | 42.5 | 60.3 |
| | | | | | | 60.5 |
| | Average | 32.07 | 36.43 | 37.70 | 41.48 | 60.36 |

**Slit: Uniform Opening Ratio: 0.25 Cavity Tilt Angle: -60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 34.0 | 45.6 | 42.5 | 47.2 | |
| | | 36.7 | 42.3 | 37.3 | 48.1 | |
| | | 38.1 | 39.2 | 34.1 | 49.0 | |
| | | | | | 48.3 | |
| | Average | 36.27 | 42.37 | 37.97 | 45.65 | |
| Outer | Local | 31.5 | 42.4 | 42.5 | 42.3 | 60.5 |
| | | 32.0 | 36.6 | 37.1 | 41.0 | 60.5 |
| | | 33.3 | 33.7 | 32.7 | 42.7 | 59.8 |
| | | | | | 43.1 | 60.4 |
| | | | | | | 60.4 |
| | Average | 32.27 | 37.57 | 37.43 | 42.28 | 60.32 |

**Slit: Uniform Opening Ratio: 0.25 Cavity Tilt Angle: -45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 33.7 | 46.2 | 43.0 | 48.9 | |
| | | 36.7 | 42.6 | 37.7 | 49.7 | |
| | | 38.0 | 39.6 | 38.8 | 50.4 | |
| | | | | | 49.8 | |
| | Average | 36.13 | 42.80 | 38.17 | 49.70 | |
| Outer | Local | 31.0 | 43.3 | 42.9 | 43.2 | 60.7 |
| | | 32.1 | 37.8 | 36.6 | 43.8 | 60.6 |
| | | 33.2 | 34.5 | 32.5 | 44.2 | 59.6 |
| | | | | | 44.4 | 60.1 |
| | | | | | | 60.6 |
| | Average | 32.10 | 38.53 | 37.33 | 44.08 | 60.32 |

**Slit: Uniform Opening Ratio: 0.25 Cavity Tilt Angle: -30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 33.5 | 46.2 | 42.3 | 49.8 | |
| | | 36.2 | 42.4 | 37.1 | 50.8 | |
| | | 38.0 | 39.4 | 33.3 | 51.4 | |
| | | | | | 50.6 | |
| | Average | 35.90 | 42.67 | 37.57 | 50.65 | |
| Outer | Local | 30.9 | 44.1 | 43.2 | 45.0 | 50.4 |
| | | 32.0 | 38.4 | 36.4 | 45.0 | 60.6 |
| | | 33.0 | 35.2 | 32.4 | 45.5 | 59.9 |
| | | | | | 45.5 | 60.5 |
| | | | | | | 60.4 |
| | Average | 31.97 | 39.23 | 37.33 | 45.20 | 60.36 |

**Slit: Uniform Opening Ratio: 0.25 Cavity Tilt Angle: -15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 33.4 | 47.8 | 42.5 | 51.0 | |
| | | 35.5 | 43.3 | 37.0 | 51.5 | |
| | | 37.2 | 42.0 | 32.9 | 52.1 | |
| | | | | | 51.0 | |
| | Average | 35.37 | 44.37 | 37.47 | 51.40 | |
| Outer | Local | 30.9 | 44.4 | 43.2 | 45.7 | 60.9 |
| | | 32.0 | 39.0 | 36.3 | 45.8 | 61.2 |
| | | 32.5 | 36.0 | 32.3 | 46.1 | 60.4 |
| | | | | | 45.8 | 60.9 |
| | | | | | | 60.8 |
| | Average | 31.80 | 39.80 | 37.27 | 45.85 | 60.84 |

**Slit: Uniform Opening Ratio: 0.25 Cavity Tilt Angle: 0°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 33.4 | 48.0 | 43.0 | 51.0 | |
| | | 35.4 | 43.7 | 36.8 | 51.9 | |
| | | 36.6 | 39.9 | 33.3 | 52.2 | |
| | | | | | 51.4 | |
| | Average | 35.13 | 43.87 | 37.70 | 51.63 | |
| Outer | Local | 31.8 | 45.1 | 43.1 | 46.2 | 61.5 |
| | | 32.4 | 39.6 | 36.2 | 46.3 | 61.9 |
| | | | 36.8 | 32.2 | 46.7 | 61.0 |
| | | | | | 46.2 | 61.6 |
| | | | | | | 61.6 |
| | Average | 31.73 | 40.50 | 37.17 | 46.35 | 61.52 |

**Slit: Uniform Opening Ratio: 0.25 Cavity Tilt Angle: 15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 33.4 | 49.8 | 42.7 | 51.5 | |
| | | 35.1 | 45.0 | 36.3 | 52.4 | |
| | | 36.5 | 39.8 | 33.0 | 52.9 | |
| | | | | | 51.7 | |
| | Average | 35.00 | 44.87 | 37.33 | 52.13 | |
| Outer | Local | 31.0 | 45.7 | 43.2 | 46.6 | 62.2 |
| | | 31.7 | 40.1 | 36.0 | 46.8 | 62.4 |
| | | 32.3 | 37.4 | 32.0 | 47.0 | 61.6 |
| | | | | | 46.6 | 62.1 |
| | | | | | | 62.0 |
| | Average | 31.67 | 41.07 | 37.07 | 46.75 | 62.06 |

**Slit: Uniform Opening Ratio: 0.25 Cavity Tilt Angle: 30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 33.5 | 52.2 | 43.4 | 51.4 | |
| | | 35.3 | 46.4 | 36.7 | 52.8 | |
| | | 36.5 | 40.0 | 33.6 | 53.3 | |
| | | | | | 52.2 | |
| | Average | 35.10 | 46.20 | 37.90 | 52.43 | |
| Outer | Local | 31.1 | 46.4 | 43.1 | 47.1 | 63.4 |
| | | 31.9 | 40.7 | 35.4 | 47.3 | 63.6 |
| | | 32.7 | 38.3 | 32.2 | 47.5 | 62.7 |
| | | | | | 46.8 | 63.3 |
| | | | | | | 63.4 |
| | Average | 31.90 | 41.80 | 36.90 | 47.18 | 63.28 |

**Slit: Uniform Opening Ratio: 0.25 Cavity Tilt Angle: 45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 33.7 | 54.3 | 44.0 | 52.6 | |
| | | 35.5 | 48.3 | 37.0 | 53.8 | |
| | | 36.7 | 40.2 | 33.7 | 54.1 | |
| | | | | | 52.8 | |
| | Average | 35.30 | 47.60 | 38.23 | 53.33 | |
| Outer | Local | 31.1 | 46.8 | 43.4 | 48.0 | 64.6 |
| | | 31.8 | 41.6 | 36.0 | 48.2 | 64.9 |
| | | 32.5 | 38.9 | 32.1 | 47.9 | 64.1 |
| | | | | | 47.4 | 64.6 |
| | | | | | | 64.3 |
| | Average | 31.80 | 42.43 | 37.17 | 47.88 | 64.50 |

**Slit: Uniform Opening Ratio: 0.25 Cavity Tilt Angle: 60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 34.1 | 56.5 | 44.3 | 53.1 | |
| | | 36.0 | 49.0 | 37.2 | 54.1 | |
| | | 37.0 | 45.2 | 34.1 | 54.6 | |
| | | | | | 53.3 | |
| | Average | 35.70 | 50.23 | 38.53 | 53.78 | |
| Outer | Local | 31.4 | 48.0 | 43.8 | 48.4 | 67.1 |
| | | 32.1 | 42.3 | 36.0 | 48.6 | 67.2 |
| | | 32.8 | 39.1 | 32.3 | 48.8 | 66.4 |
| | | | | | 48.0 | 66.8 |
| | | | | | | 66.4 |
| | Average | 32.10 | 43.13 | 37.37 | 48.45 | 66.78 |

Slit: Uniform  Opening Ratio: 0.25  Cavity Tilt Angle: 75°

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 34.5 | 56.0 | 47.0 | 53.7 | |
| | | 36.6 | 47.9 | 38.1 | 55.1 | |
| | | 36.9 | 42.0 | 34.9 | 55.5 | |
| | | | | | 53.9 | |
| | Average | 36.00 | 48.47 | 40.00 | 54.55 | |
| Outer | Local | 31.3 | 48.4 | 44.2 | 48.9 | 68.8 |
| | | 31.9 | 42.2 | 36.1 | 49.1 | 68.9 |
| | | 32.4 | 37.8 | 32.9 | 49.3 | 68.5 |
| | | | | | 48.5 | 69.0 |
| | | | | | | 70.0 |
| | Average | 31.87 | 42.80 | 37.73 | 48.95 | 69.05 |

Slit: Uniform  Opening Ratio: 0.25  Cavity Tilt Angle: 90°

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 35.0 | 50.6 | 51.2 | 45.6 | |
| | | 36.8 | 44.3 | 40.6 | 55.7 | |
| | | 36.4 | 90.5 | 36.8 | 56.1 | |
| | | | | | 54.6 | |
| | Average | 36.07 | 45.13 | 42.87 | 55.30 | |
| Outer | Local | 31.3 | 48.7 | 45.4 | 49.2 | 70.5 |
| | | 31.9 | 41.9 | 36.5 | 49.3 | 70.4 |
| | | 32.1 | 35.6 | 30.3 | 49.7 | 70.3 |
| | | | | | 49.0 | 71.0 |
| | | | | | | 70.5 |
| | Average | 31.77 | 42.07 | 39.40 | 49.30 | 70.54 |

Slit: Uniform  Opening Ratio: 0.50  Cavity Tilt Angle: -90°

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 38.2 | 44.0 | 46.0 | 49.4 | |
| | | 38.0 | 40.0 | 39.6 | 50.7 | |
| | | | 37.1 | 38.2 | 51.7 | |
| | | | | | 50.9 | |
| | Average | 38.10 | 40.37 | 41.27 | 50.68 | |
| Outer | Local | 34.0 | 43.0 | 44.4 | 44.9 | 60.2 |
| | | 33.7 | 37.0 | 38.0 | 45.1 | 59.7 |
| | | | 33.9 | 34.5 | 45.7 | 59.6 |
| | | | | | 45.8 | 60.5 |
| | | | | | | 60.7 |
| | Average | 33.85 | 37.97 | 38.97 | 45.38 | 60.14 |

**Slit: Uniform Opening Ratio: 0. 50 Cavity Tilt Angle: -75°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 37.5 | 43.5 | 46.8 | 51.8 | |
| | | 36.5 | 39.6 | 41.3 | 53.4 | |
| | | | 36.9 | 39.3 | 54.2 | |
| | | | | | 53.4 | |
| | Average | 37.00 | 40.00 | 42.47 | 53.20 | |
| Outer | Local | 33.1 | 44.0 | 46.4 | 47.2 | 60.6 |
| | | 32.5 | 37.1 | 38.1 | 47.7 | 59.8 |
| | | | 34.0 | 34.7 | 48.3 | 60.2 |
| | | | | | 48.2 | 61.2 |
| | | | | | | 61.3 |
| | Average | 32.80 | 38.37 | 39.73 | 47.85 | 60.62 |

**Slit: Uniform Opening Ratio: 0.50 Cavity Tilt Angle: -60°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 37.0 | 42.0 | 47.9 | 52.0 | |
| | | 35.7 | 38.7 | 42.0 | 53.6 | |
| | | | 36.7 | 41.0 | 54.3 | |
| | | | | | 53.6 | |
| | Average | 36.35 | 39.13 | 43.63 | 53.38 | |
| Outer | Local | 33.1 | 44.3 | 46.6 | 47.4 | 60.8 |
| | | 32.7 | 37.2 | 42.6 | 48.1 | 60.2 |
| | | | 33.9 | 36.1 | 48.7 | 60.0 |
| | | | | | 48.5 | 61.3 |
| | | | | | | 61.7 |
| | Average | 32.90 | 38.47 | 41.77 | 48.18 | 60.80 |

**Slit: Uniform Opening Ratio: 0.50 Cavity Tilt Angle: -45°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.4 | 41.0 | 48.5 | 52.0 | |
| | | 35.0 | 38.8 | 42.5 | 53.7 | |
| | | | 36.4 | 40.4 | 54.5 | |
| | | | | | 53.7 | |
| | Average | 35.70 | 38.73 | 43.80 | 53.48 | |
| Outer | Local | 33.0 | 44.2 | 46.8 | 47.5 | 60.9 |
| | | 32.5 | 36.9 | 39.9 | 48.1 | 60.3 |
| | | | 33.0 | 36.0 | 48.8 | 60.3 |
| | | | | | 48.5 | 61.5 |
| | | | | | | 61.9 |
| | Average | 32.75 | 38.23 | 40.90 | 48.23 | 60.98 |

**Slit: Uniform    Opening Ratio: 0. 50    Cavity Tilt Angle: -30°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.5 | 40.5 | 49.0 | 51.8 | |
| | | 35.0 | 38.5 | 42.7 | 53.5 | |
| | | | 36.2 | 40.6 | 54.5 | |
| | | | | | 53.7 | |
| | Average | 35.75 | 38.40 | 44.10 | 53.38 | |
| Outer | Local | 32.9 | 43.8 | 47.0 | 47.4 | 61.2 |
| | | 32.5 | 36.8 | 40.5 | 48.4 | 60.8 |
| | | | 33.6 | 36.5 | 49.1 | 60.8 |
| | | | | | 48.7 | 62.5 |
| | | | | | | 62.1 |
| | Average | 32.70 | 38.07 | 41.33 | 48.40 | 61.48 |

**Slit: Uniform    Opening Ratio: 0.50    Cavity Tilt Angle: -15°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.3 | 40.2 | 49.3 | 52.4 | |
| | | 34.8 | 38.0 | 43.5 | 54.4 | |
| | | | 38.0 | 41.3 | 55.4 | |
| | | | | | 54.3 | |
| | Average | 35.55 | 38.07 | 44.70 | 54.13 | |
| Outer | Local | 32.8 | 43.9 | 47.0 | 47.9 | 61.6 |
| | | 32.5 | 36.6 | 40.0 | 48.9 | 61.2 |
| | | | 33.6 | 37.0 | 49.8 | 61.3 |
| | | | | | 49.4 | 62.4 |
| | | | | | | 62.8 |
| | Average | 32.65 | 38.03 | 41.90 | 49.00 | 61.86 |

**Slit: Uniform    Opening Ratio: 0.50    Cavity Tilt Angle: 0°**

| Surface | | Temperature(°C) | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 35.8 | 39.2 | 49.5 | 52.6 | |
| | | 34.5 | 37.6 | 44.5 | 54.7 | |
| | | | 35.3 | 42.3 | 55.8 | |
| | | | | | 54.7 | |
| | Average | 35.15 | 37.37 | 45.43 | 54.45 | |
| Outer | Local | 32.6 | 43.7 | 48.1 | 48.1 | 62.2 |
| | | 32.2 | 36.2 | 41.5 | 49.3 | 61.9 |
| | | | 33.3 | 37.7 | 50.2 | 61.8 |
| | | | | | 49.8 | 62.9 |
| | | | | | | 63.2 |
| | Average | 32.40 | 37.73 | 42.43 | 49.35 | 62.40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | 50.2 | [illegible] |
| | | | | | | 63.7 |
| | Average | 32.05 | 37.67 | 42.93 | 49.78 | 62.90 |

**Slit: Uniform    Opening Ratio: 0.50    Cavity Tilt Angle: 30°**

| Surface | Temperature(°C) | | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 35.8 | 40.0 | 52.1 | 53.1 | |
| | | 34.6 | 37.4 | 46.4 | 55.3 | |
| | | | 35.6 | 44.3 | 56.5 | |
| | | | | | 55.5 | |
| | Average | 35.20 | 37.67 | 47.60 | 55.10 | |
| Outer | Local | 32.7 | 44.1 | 49.1 | 48.8 | 63.2 |
| | | 32.2 | 36.3 | 42.4 | 50.2 | 62.8 |
| | | | 33.3 | 39.0 | 51.1 | 63.1 |
| | | | | | 50.7 | 64.2 |
| | | | | | | 64.6 |
| | Average | 32.45 | 37.90 | 43.50 | 50.20 | 63.58 |

**Slit: Uniform    Opening Ratio: 0.50    Cavity Tilt Angle: 45°**

| Surface | Temperature(°C) | | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.0 | 40.0 | 53.7 | 53.5 | |
| | | 34.9 | 37.5 | 47.5 | 55.8 | |
| | | | 34.6 | 45.3 | 57.0 | |
| | | | | | 56.2 | |
| | Average | 35.45 | 37.70 | 48.83 | 55.63 | |
| Outer | Local | 32.9 | 44.3 | 49.7 | 49.2 | 63.8 |
| | | 32.4 | 36.5 | 43.0 | 50.6 | 63.3 |
| | | | 33.5 | 39.5 | 51.6 | 63.6 |
| | | | | | 51.1 | 65.0 |
| | | | | | | 65.1 |
| | Average | 32.65 | 38.10 | 44.07 | 50.63 | 64.16 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | 51.7 | 66.4 |
| | | | | | | 66.5 |
| | Average | 32.90 | 38.33 | 44.57 | 51.10 | 65.60 |

**Slit: Uniform Opening Ratio: 0.50 Cavity Tilt Angle: 75°**

| Surface | Temperature(°C) | | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 36.7 | 44.0 | 55.8 | 54.1 | |
| | | 35.6 | 38.3 | 46.9 | 56.3 | |
| | | | 36.1 | 43.2 | 57.5 | |
| | | | | | 56.7 | |
| | Average | 36.15 | 39.47 | 48.63 | 56.15 | |
| Outer | Local | 33.2 | 44.7 | 50.7 | 49.5 | 67.2 |
| | | 32.7 | 36.6 | 43.8 | 50.9 | 66.8 |
| | | | 33.6 | 38.8 | 52.1 | 67.2 |
| | | | | | 51.7 | 67.9 |
| | | | | | | 68.0 |
| | Average | 32.95 | 38.30 | 44.43 | 51.05 | 67.42 |

**Slit: Uniform Opening Ratio: 0.50 Cavity Tilt Angle: 90°**

| Surface | Temperature(°C) | | | | | |
|---|---|---|---|---|---|---|
| | | Wall-1 | Wall-2 | Wall-3 | Wall-4 | Heater |
| Inner | Local | 37.2 | 50.2 | 54.6 | 55.1 | |
| | | 36.5 | 41.5 | 46.6 | 57.2 | |
| | | | 37.2 | 41.8 | 58.4 | |
| | | | | | 57.5 | |
| | Average | 36.85 | 42.97 | 47.67 | 57.05 | |
| Outer | Local | 33.4 | 45.6 | 51.0 | 50.1 | 69.4 |
| | | 33.0 | 37.3 | 43.5 | 51.6 | 69.5 |
| | | | 34.3 | 37.8 | 52.6 | 69.5 |
| | | | | | 52.3 | 70.1 |
| | | | | | | 70.0 |
| | Average | 33.20 | 39.07 | 44.10 | 51.65 | 69.70 |