

**THE EFFECT OF ORIENTATION AND PROPERTIES OF TINTED  
SOLAR CONTROL ON CONDUCTIVE HEAT GAIN THROUGH  
WINDOWS**

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# TABLE OF CONTENTS

	<u>Page</u>
<b>ACKNOWLEDGMENTS</b> .....	<b>iii</b>
<b>TABLE OF CONTENTS</b> .....	<b>iv</b>
<b>LIST OF TABLES</b> .....	<b>vii</b>
<b>LIST OF FIGURES</b> .....	<b>viii</b>
<b>LIST OF ABBREVIATIONS</b> .....	<b>x</b>
<b>ABSTRACT</b> .....	<b>xi</b>
<b>ABSTRAK</b> .....	<b>xii</b>
 <b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background of study .....	1
1.2 Problem statements .....	3
1.3 Significance study .....	3
1.4 Objectives of study.....	4
1.5 Scope and limitation.....	4
 <b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Introduction.....	5
2.2 Climate in Malaysia	
2.2.1 World climate.....	5
2.2.2 Temperature in Malaysia.....	6
2.2.3 Solar ultraviolet index (UVI) .....	8
2.2.4 Humidity .....	8
2.2.5 Wind flow pattern .....	8
2.2.6 Sun path Shah Alam.....	9
2.3 Heat transfer.....	10
2.4 Heat gain .....	12
2.5 Rating system	
2.5.1 Green Building Index.....	13
2.5.2 Malaysian Standard.....	14

## ABSTRACT

### THE EFFECT OF ORIENTATION AND PROPERTIES OF TINTED SOLAR CONTROL ON CONDUCTIVE HEAT GAIN THROUGH WINDOWS

This is a field study to evaluate the effect of vertical glazing solar control materials on solar heat gain and OTTV of the building. A test cell located in the campus of UiTM Shah Alam is used as case study. Thermocouple type T was used to measure the surface temperature of the test cell wall and window facing north and west with five different types of solar control materials which are control system, system 4, system 5, system 6 and system 7. Thermocouples was attached at external and internal surface of windows that facing north and west. The data of surface temperature was recorded by automatic data logging system at an interval of 5 minutes for duration of 50 days. The solar heat gain was calculated and compare between the system and orientations where the calculation depends on thermal characteristics of the windows, there are the SC, VLT, SEA, SER and U-value. The difference of optical characteristics of solar control materials depends on its visible transmittance. The control system has highest VLT which is 89%; therefore it has the highest solar heat gain. While, system 4 has lower VLT which is 12.7%, so the solar heat gain is lower. The value of VLT for each system 5, 6 and 7 is 73.2%, 50.7% and 32.6%. Then, the value of OTTV is depends with the orientations of the building. North have lower OTTV value than the west. The system 5 has higher OTTV value for both orientations where north  $21.7 \text{ Wm}^{-2}$  is and west is  $22.1 \text{ Wm}^{-2}$ . After that, follow by control system, at north is  $20.28 \text{ Wm}^{-2}$  and west is  $20.56 \text{ Wm}^{-2}$ . For system 6, at north the OTTV value is  $20.4 \text{ Wm}^{-2}$  and west is  $20.8 \text{ Wm}^{-2}$ . System 7 has  $17.7 \text{ Wm}^{-2}$  for OTTV value at north and  $18 \text{ Wm}^{-2}$  at west. Lastly, system 4 has the lower value OTTV where  $15.2 \text{ Wm}^{-2}$  at north and  $15.4 \text{ Wm}^{-2}$  at west.

