IRUV CUT COAT

-IRUV CUT COAT Energy Saving Performance Measurement-



1: Purpose

The purpose of energy-saving performance measurement

- Verify the thermal barrier effect of IRUV cut coat application
- Quantify the energy-saving effect of IRUV cut coat by measurement.

Preconditions of trial calculation

Condition 1

• When the average room temperature goes down 1° during the operation time, Energy saving gets to 10% reduction of air conditioner cost.

Condition 2

• The energy effect is calculated by electricity fee only (except gas , heavy oil , Heating oil.)

Condition 3

• Application room is working by the commercial air conditioning system, even if actual air conditioner is Central air-conditioning system and so on.

Procedure of trial measurement

STEP1 : Preparation

The selected two rooms to be measured, to collect the necessary data

STEP2 : Room temperature measurement

It measures both coated and uncoated rooms temperature. And also, It calculates the difference between the average room temperature of 2 rooms

STEP3: To calculate the electricity consumption and the years depreciation

Set the energy saving performance to 10% reduction when the temperature difference is 1°C. It calculates Annual electricity consumption reduction compared between coated room and uncoated room.



[STEP1] Two rooms to be measured

«Selection condition» * Prepare the rooms have same condition as much as possible !

① Same floor area

② Same direction of Window

③ Same number and the size of window

(4)Nobody use measuring rooms

 \Rightarrow We recommend to measure during holidays and day off .

≫Notes

•In the case of the measurement room is wide space (atrium, etc.) or large floor area, there might be no temperature difference between coated and uncoated room. Because the room temperature is often changed.

•Please select Small and medium-sized room (such as a conference room) that is as much as possible hermetically sealed as measure room.

• It might be difficult to see the effect by the measurement time.

STEP1: Preparation

We select 2 rooms as measure target, and collect Necessary data.



(STEP1) Collect necessary information before calculating
(Mean temperature difference; It measures room temperature of coated and uncoated
(Power consumption of air conditioning
(3) Operation time / day off/ holiday of Air conditioning
(4) Operation period for a year

STEP1: Advance preparation

We select 2 rooms as measure target, and collect Necessary data.



[STEP2] Method of measuring the room temperature

It measures 2 rooms temperature of Coated and Uncoated more than 1 week.

2 rooms are the same area of windowpane , floor , direction. **(Notes while the measuring period)**(1)2 measuring points; The distance is 15cm and 5m from the window pane at each room
(2)Measuring interval; 10-30 minute intervals
(3)Turn off air conditioner while measuring
(4)Keep open the curtain or the window shade
(5)Don't open the windowpane



STEP2: Measuring room temperature

It measures 2 rooms temperature and calculates the difference of mean 2 rooms temperature.



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[STEP2] Calculating the mean room temperature difference

- It calculates an average value of the room temperature during the operating time.
- It calculates the mean room temperature difference between coated room and uncoated room



STEP1	$\overline{)}$	STEP2		STEP3				
[STEP3] Calculating electric consumption amount								
 Calculating the power consumption of air-conditioning after application 								
•Simulation : The mean temperature difference is 2°C. Power consumption of air conditioning is 18kW After application , the power consumption of air-conditioning is below $18kW-(18kW \times 0.2) = \underline{14.4kW}$								
 Calculating the reduction amount of electricity consumption 								
•Simulation : Operation time of air-conditioning per a day : 10hours , a year : 365days power consumption before application[kWh]=(18kW × 10hours × 365days)= <u>65,700Wh</u> power consumption after application[kWh]=(14.4kW × 10hours × 365days)= <u>52,560Wh</u> Power consumption reduction =657,00Wh, 52,560Wh = 13,140Wh								
■ Calculating the energy saving cost and the payback period								
• Simulation : Electricity rates is 15Yen/kwh, Application area is 200sqm, Application cost is 200sqm × 2,500Yen=500,000Yen Reduce cost for a year = $\underline{13,140Wh}$ × 15Yen= $\underline{197,100Yen}$								
Reduce cost for a year	- <u>13,140 ////</u>	15101-17,10	<u>ioren</u>					

Payback period = 500,000 Yen $\div 197,100$ Yen = within 2.6 years

STEP3: The calculated power consumption

Assumption is that \lceil the mean temperature difference of $1^{\circ}C \Rightarrow$ energy saving of 10% J We calculated the annual power consumption reduction

	STEP1	STEP2		STEP3						
Using Calculating formula at excel sheet										
Ca	alculating formula of energy saving for IRUV Cut Coat Please write only inside space is automatically calculated	© [[What is the electric 15 Yen/kwh <u>How many</u> field did 200 m²	ity rate ? I you apply ?						
0	What is the Mean temperature difference between coated room and u 2 °C 20 % Energy saving of air conditioning What is thePower consumption of air conditioning ? 18 kwh	ncoated room? 8 9	How much is the ap 200 × Did you pay other o Yen	pplication cost ? 2500 Yen/m ² = cost for application? H ⇒ Total cost i	500000 Yen ow much is it? s 500000 Yen					
3	After application, the power consumption of air-conditioning is below $18 \text{ kwh} - 3.6 = 14.4 \text{ kwh}$	((Reduction cost for a 197100 Yen	a year						
4	How many time is your Operation time of air-conditioning ?	¢	Amortization period 2.5 years	1						
\$	Power consumption reduction for a year 13140 Wh									

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