Project Final Report

Study on Phase-Change Energy Storage for Energy Reduction of Air-Conditioner in Air Cooling

Submitted to

Daikin Industries Thailand

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EXECUTIVE SUMMARY

In this study, a concept of using phase change material (PCM) for improving cooling efficiency of air-conditioner has been presented. Two phases of the study each of 6 months have been carried out with the details as follows:

The 1st phase (April-September 2011)

In this phase, a testing unit of air-conditioner will be performed in a tested room with a cooling load around 2 TR and the electricity cost for the normal system is considered. The system has a well-insulated temperature-controlled room with dimensions of 2.4 m x 3.6 m x 2.5 m. Thermal performance of the normal unit is considered.

Moreover, study on a PCM storage integrated to the air-conditioner is also considered. The pressure drop and the flow distribution of the air passing through the bed are investigated.

The 2nd Phase (October 2011-March 2012)

Thermal performances of the air-conditioner with the PCM storage is considered and compared with the unit without the PCM storage. It could be seen that the electrical power of the normal system is around 39.36 kWh/d compared with around 35.42 kWh/d of the modified system of which the decrease is around 3.94 kWh/d. The saving from the PCM bed could be 38.46 Baht/d or 6,568.49 Baht/y while the PCM cost is around 23,040 Baht for 57.60 liter of the PCM of which the bed thickness is at 40 cm. The payback period is around 3.51 y.

CHAPTER 1
INTRODUCTION

In office building, the main electrical energy consumption is devoted to air-conditioning system. Therefore, it is necessary to find techniques those could be used to reduce the load of the machine or to enhance its performance. Some researchers have used phase change material (PCM) as a tool to reduce cooling load by utilizing cool ambient air in the nighttime which is used to charge the latent heat capacity of the PCM by freezing the material and the stored energy is released back to the occupied space to handle the heat gains during daytime.

1.1 Literature Review

Using of PCM in the energy building has been presented in many literatures. Stritih et al [1] presented an alternative method of cooling and ventilating buildings by integrating PCM into ceiling board of a building as shown in Figure 1.1. Outside cool night air could be introduced into the space and it was used to cool the building interior and the PCM storage. During the daytime, hot indoor air was circulated in the room and the use of PCM was to absorb cooling load and reduce the room temperature. Some calculations were performed in different cities and it could be found that this technique could reduce energy for cooling between 10-87 % depended on the air flow rate.

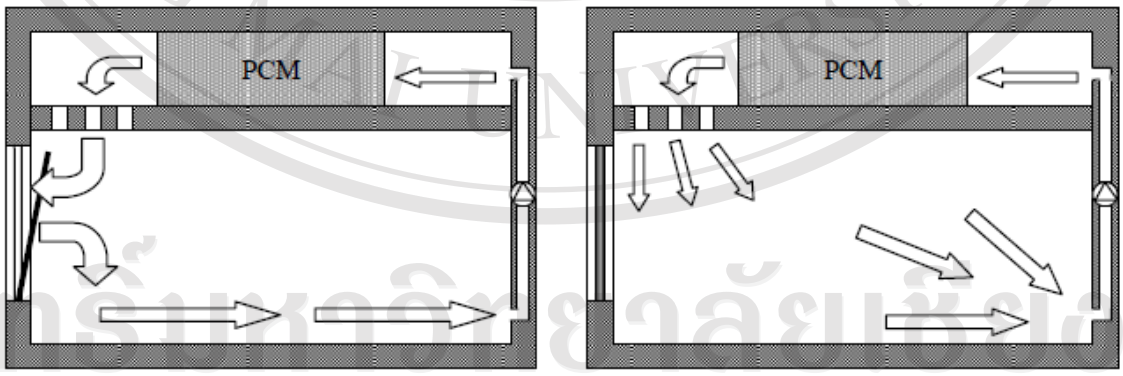


Figure 1.1 Principle function of PCM “free cooling system”: (left) night time, (right) day time [1].

Arkar et al [2] designed a latent heat storage (LHTES) integrating into a mechanical ventilation system. The storage medium was a type of paraffin encapsulated

in spheres as shown in Figure 1.2. The LHTES stored coldness of ambient air during the night and supply it with time delay during the day thus free cooling was obtained. A case study of a low energy one family building in Slovenia was carried out. The technique could maintain the room temperature to be lower than that of the ambient temperature and the free cooling helped reducing the size of mechanical ventilation system.

Since PCMs could act as thermal energy storage in buildings. The medium could store coolness using nighttime cheap electricity and the coolness could be used during daytime for space cooling. Yamaha and Misaki [3] proposed an air distribution system with PCMs in air ducts for peak load shaving. The concept was shown in Figure 1.3.

The PCM storage was charged from 5:00 am to 8:00 am (the charging mode) by the air flowing in the closed loop of the PCM storage tank and the air conditioner to solidify the storage medium. When the charging operation finished, the ordinary air-conditioning operation started, in which the air was bypassed the PCM storage tank and fed into the occupied room. The discharging operation was occurred from 13:00 pm to 16:00 pm. At this mode, the air after the air-conditioner at a temperature slightly higher than that of the PCM melting point would flow through the PCM tank and to the room.

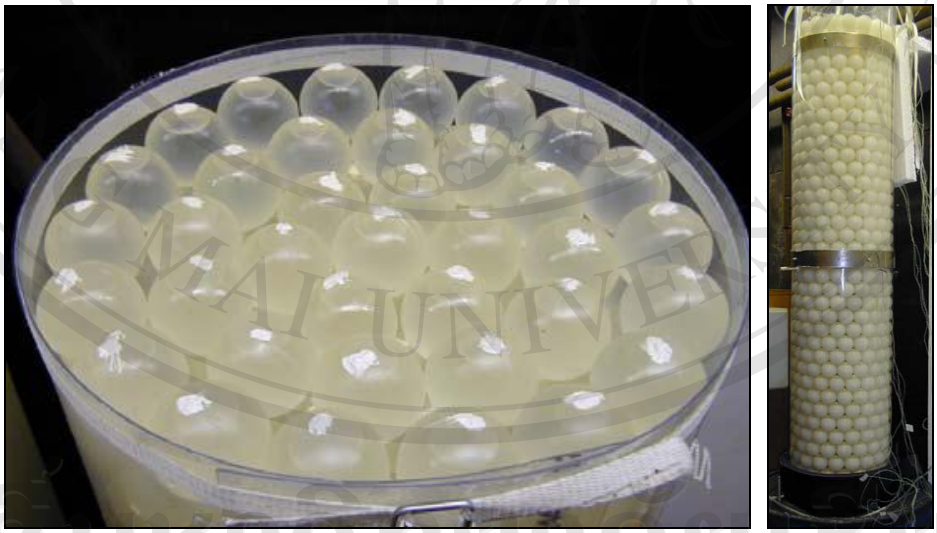


Figure 1.2 The LHTES with PCM encapsulated in spheres (d=50mm) packing [2].

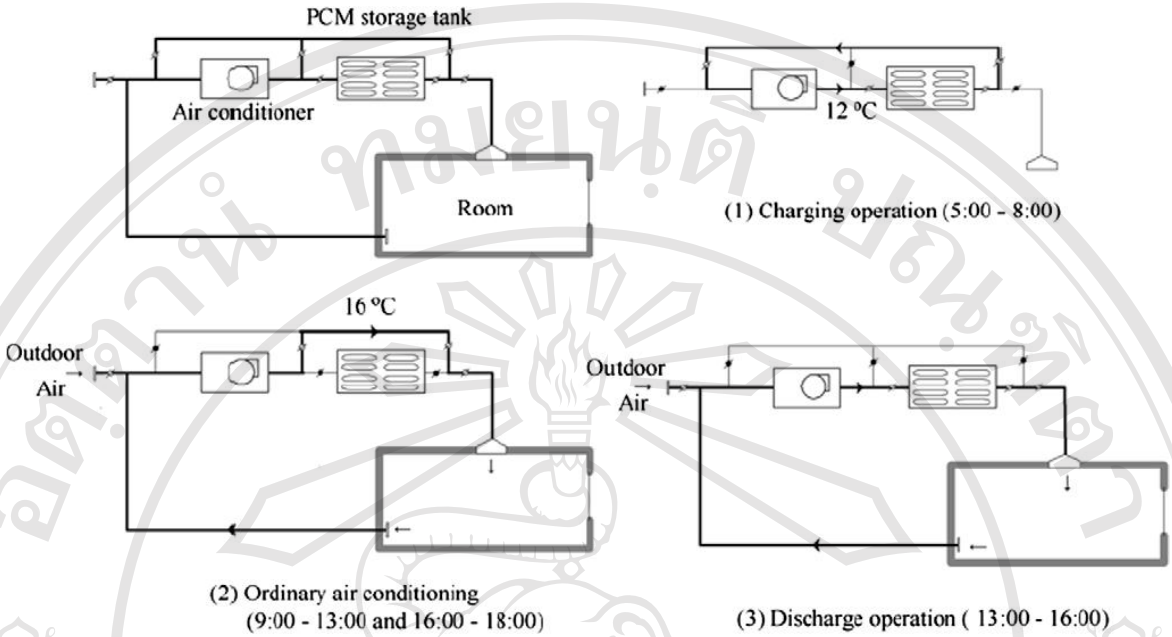


Figure 1.3 Schematics of the HVAC system proposed by Yamaha and Misaki [3].

The simulation study based on a part of one floor of an office building in Japan showed that the use of 400 kg PCM for a room with an area of 73.8 m^2 surface could maintain a constant indoor temperature without using any cold source in a hot summer day. The melting temperature suitable for the system was around 19 ^oC, which could be achieved by MT 19.

In this study, a concept similar to Yamaha and Misaki [3] is considered with the climate of Chiang Mai which is hotter than that of Japan and the countries reported in the literatures. The design of the PCM tank is a pack of PCM balls similar to that of Arkar et al [2]. An experimental study is performed in a tested room with a cooling load around 2 TR and the electricity costs for the normal system and the system with the PCM are considered. The effect of the storage size on the system performance are also considered.

1.2 Objective of the Study

The objective of this study is to study the use of PCM to reduce energy consumption of air-conditioner for air cooling in a hot and humid climate such as Thailand.

1.3 Research Methodology

The study is separated into 2 parts: the first one is to set up an experimental test room having an external 2 TR air-conditioner. The load comes from an electrical heater with temperature control. The air-conditioner unit will be used to cool air entering into the room and cool a storage medium which is a set of paraffin balls contained in a packed bed storage tank. The concept will be similar to Yamaha and Misaki [3] as shown in Figure 1.4. But in this study, the PCM storage is installed below the air-conditioner because the nighttime ambient temperature in Chiang Mai, Thailand is mostly higher than the PCM melting point (around19-22 ^{o}C). Therefore, in the charging mode, the supply air from the evaporator is used to cool and solidify the PCM storage during the off-peak period. During the daytime, the air-conditioner will be used to control the air entering the room at the temperature around 16-20 ^{o}C and the return air at a temperature slightly higher than that of the PCM melting point such as 22-25 ^{o}C will be fed through the PCM bed. Then the air entering the evaporator will have lower temperature than the normal system which means that the cooling load is reduced. Thus the electrical power consumption of the air-conditioner could be reduced.

The storage medium is a paraffin having the melting point of around19-22 ^{o}C which contains in a set of plastic balls kept in a packed bed. The pressure drop of the air flowing through the bed is considered. If it is too high, there will be a set of by-pass copper tube along the height of the storage tank as shown in Figure 1.5. This concept has been used successfully in a pebble-bed sensible heat storage [4].

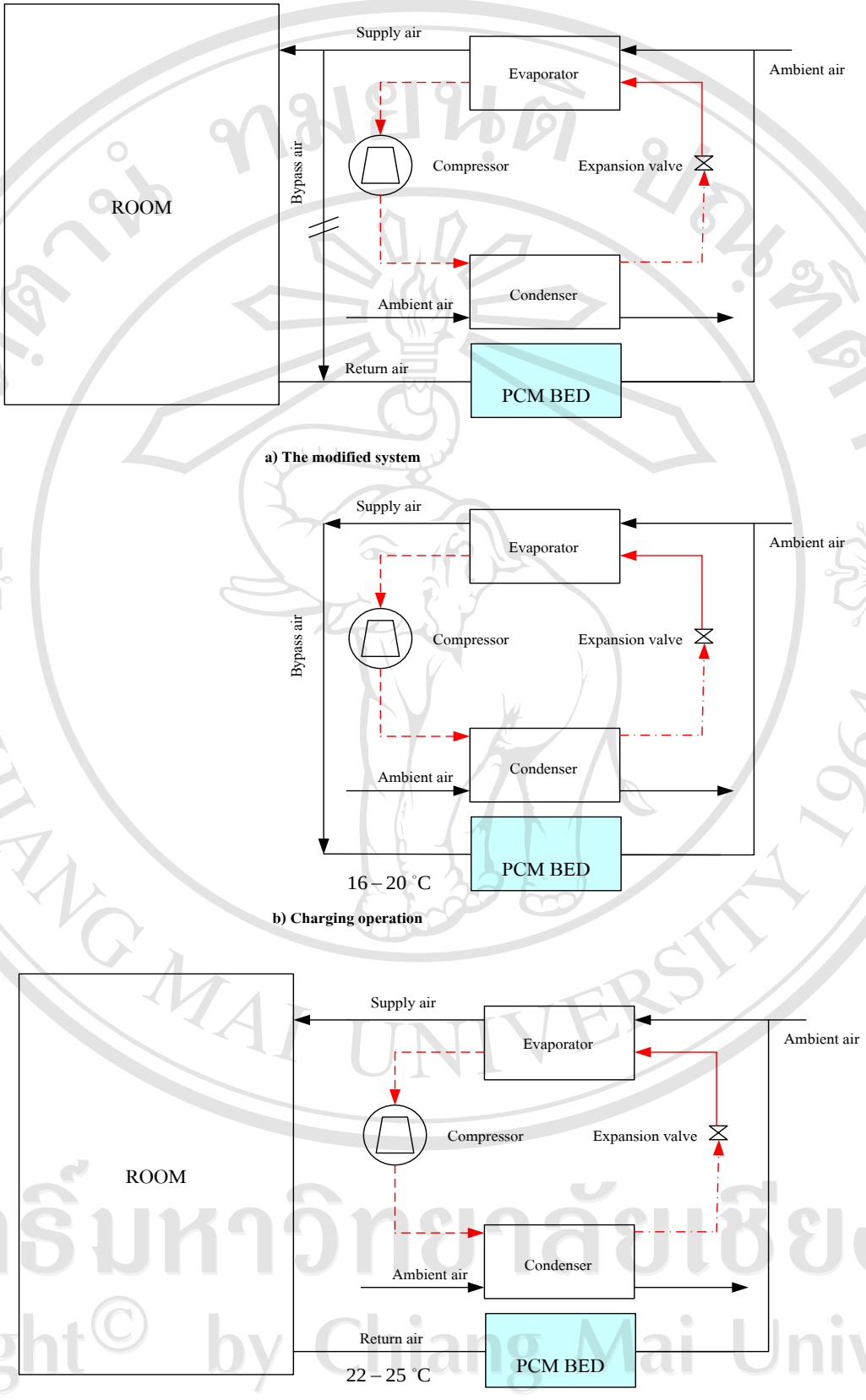


Figure 1.4 Schematic of the tested room.

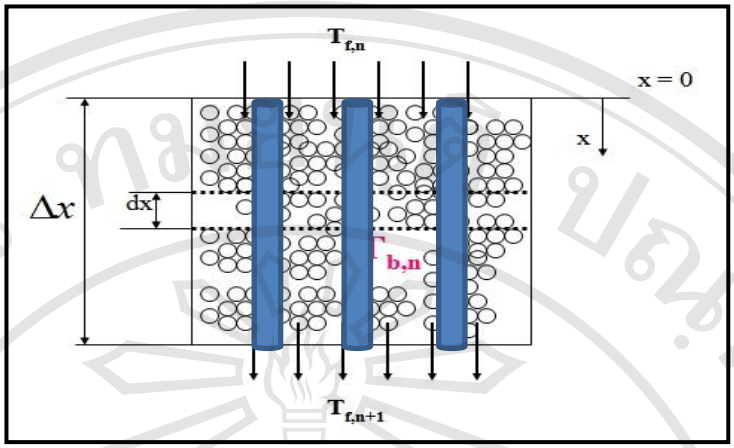


Figure 1.5 The concept of the storage tank with by-pass air ducts [4].

The size of the storage tank will be varied depending on the cooling load and the air flow rate. The COP and the electrical power supplied to the air-conditioner will be recorded.

For the second part of the study, the economic analysis will be considered to find out the appropriate size of the storage matching with the air-conditioner.

1.4 Benefits from the Research Study

The concept of PCM storage integrating into air-conditioner could be used to reduce the electrical consumption for cooling in office buildings, hotels or hospitals including the greenhouse gas emission due to the power generation from the fossil fuel.

CHAPTER 2

Testing Equipments

2.1 Air-Conditioner

In this study, a R-134a air conditioner of 2 TR (24,000 BTU/h) with air-cooled condenser will be tested its performances as reference compared with the new design that there is an integrated PCM storage. The diagram of the air-conditioner with air-cooled condenser is shown in Figure 2.1. Table 2.1 also shows the descriptions of the air-conditioner components.

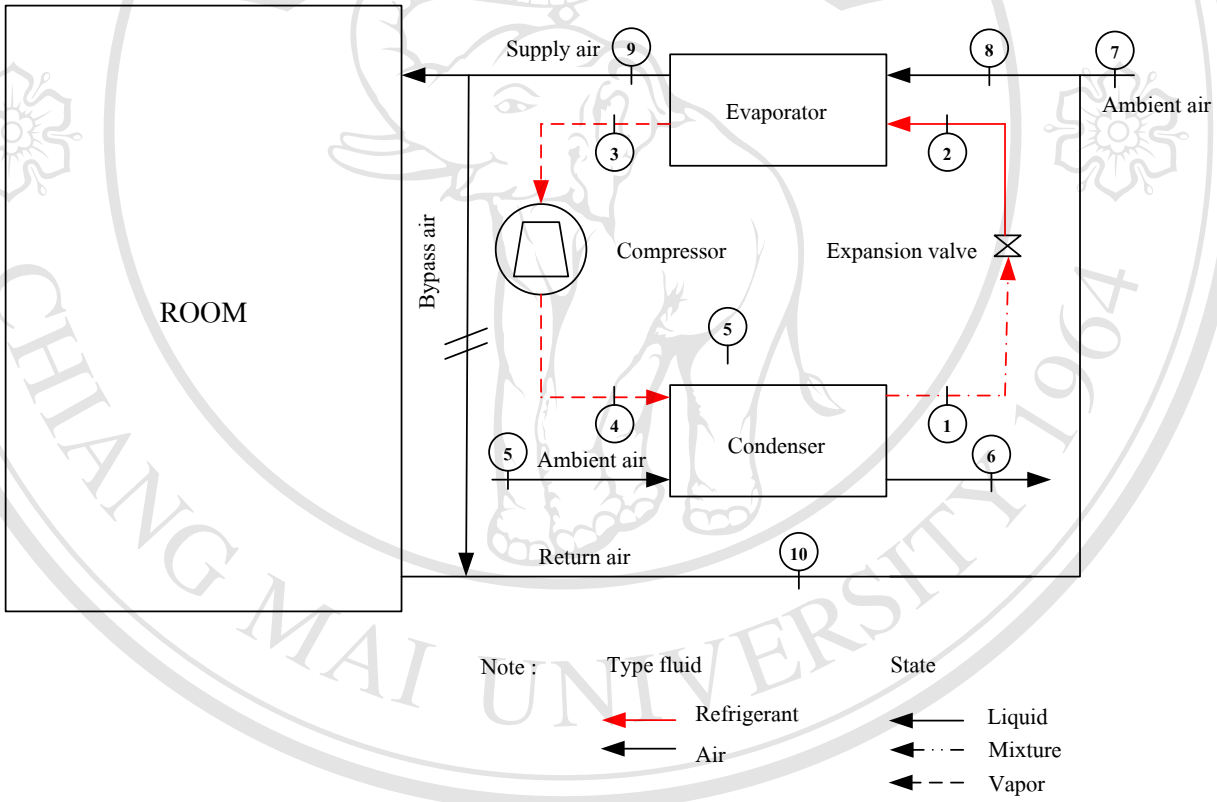


Figure 2.1 Diagram of the tested R-134a air-conditioner with air-cooled condenser.

Table 2.1 Descriptions of air-conditioner components.

Devices	Type	Material	Properties
1. Fan coil	Fin and Tube heat exchanger	Copper and Aluminium	1. Capacity 7.032 kW 2. Tube Size (OD) 5.0 mm 3. Fins per inch 18 (FPI) 4. No. of Rows & Column 2R, 15C
2. Compressor	Hermatic (Rotary) compressor R-134a	Cast Iron	1. Capacity 2.868 kW 2. Compression ratio 6.0 Max
3. Condenser	Fin and Tube heat exchanger	Stainless steel	1. Capacity 5.275 kW 2. Tube Size (OD) 7.0 mm 3. Fins per inch 18 (FPI) 4. No. of Rows & Column 2R, 36C
4. Expansion valve	Orifice type Thermo static	Bronzed	1. Capacity 7.032 kW 2. Pressure ratio 3.00

2.2 Improvement of Air-Conditioner

The schematic sketch of a phase change material (PCM) to improve the cooling performance of the air-conditioner is shown in Figure 2.2. The air-conditioner unit is used to cool the air entering at state 8 before supplying into the room at state 9. The return air leaving the room at state 10 will be fed through the PCM bed. The PCM storage is a set of paraffin balls in solid phase and it is used to reduce the return air temperature (the PCM is melted) before entering the evaporator at state 11 and the new cycle restarts. Therefore, the load at the evaporator of the air-conditioner is less compared with the normal system which results in lower power consumption of the air-conditioning unit.

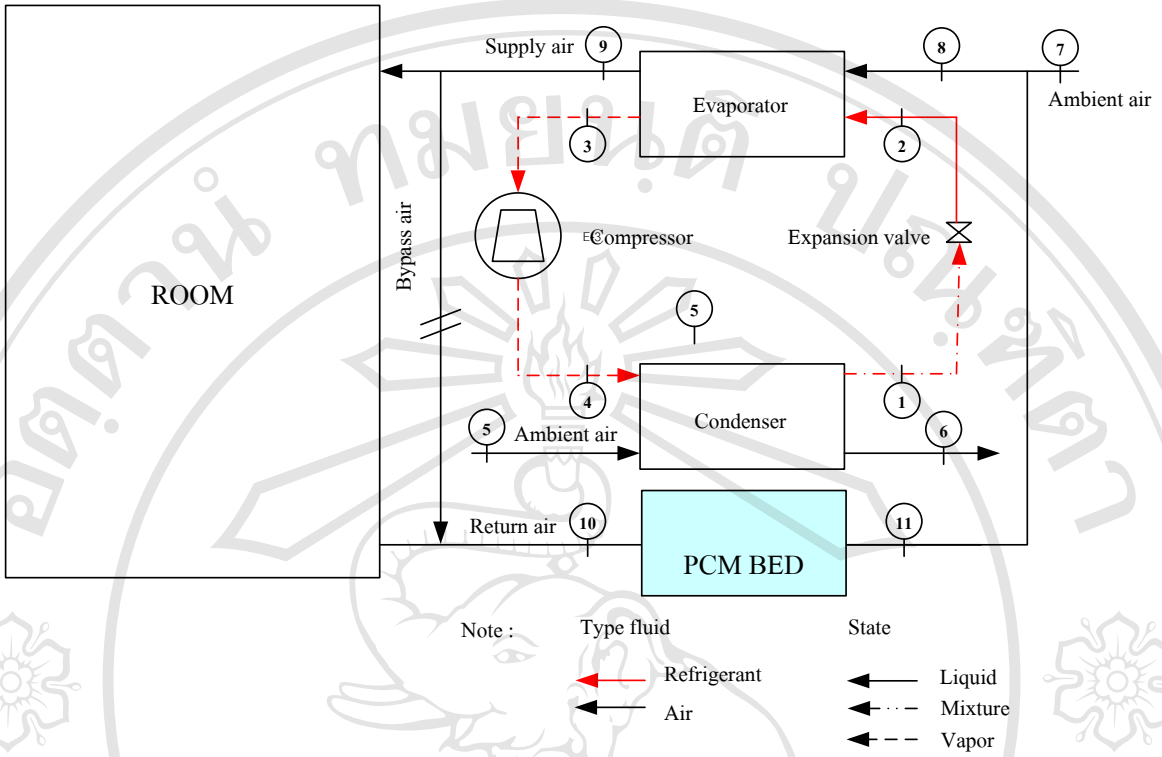
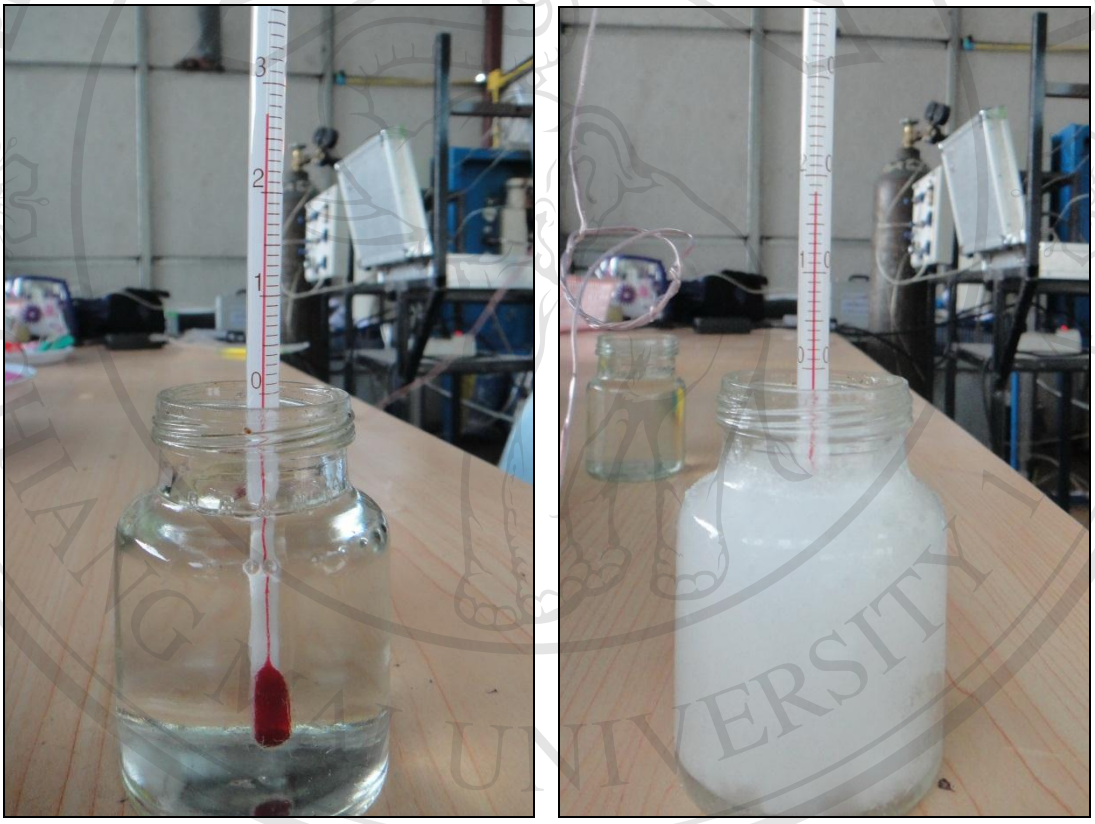


Figure 2.2 Diagram of the air-conditioner with PCM storage to improve cooling performance.

In this study Rubitherm20 (RT-20) is selected to be the storage medium to improve the cooling performance of the air-conditioner because the melting temperature point of RT-20 is lower than the return air temperature and it is higher than the supply air in the charging mode. The properties of the RT-20 are given in Table 2.2 and Figure 2.3. Figure 2.4 also shows the PCM ball (in the experiment, the ball is made of celluloid).

Table 2.2 Descriptions of the RT-20 properties.

RT-20	Properties
Paraffin melting peak point (°C)	22
Freezing peak point (°C)	20
Heat of fusion (kJ/kg)	130
Density liquid (kg/l)	0.75
Volume expansion	10 %



a) R-20 at the liquid phase b) R-20 at the solid phase

Figure 2.3 The liquid and solid phases of RT-20 at temperature around 27 °C and 18 °C.

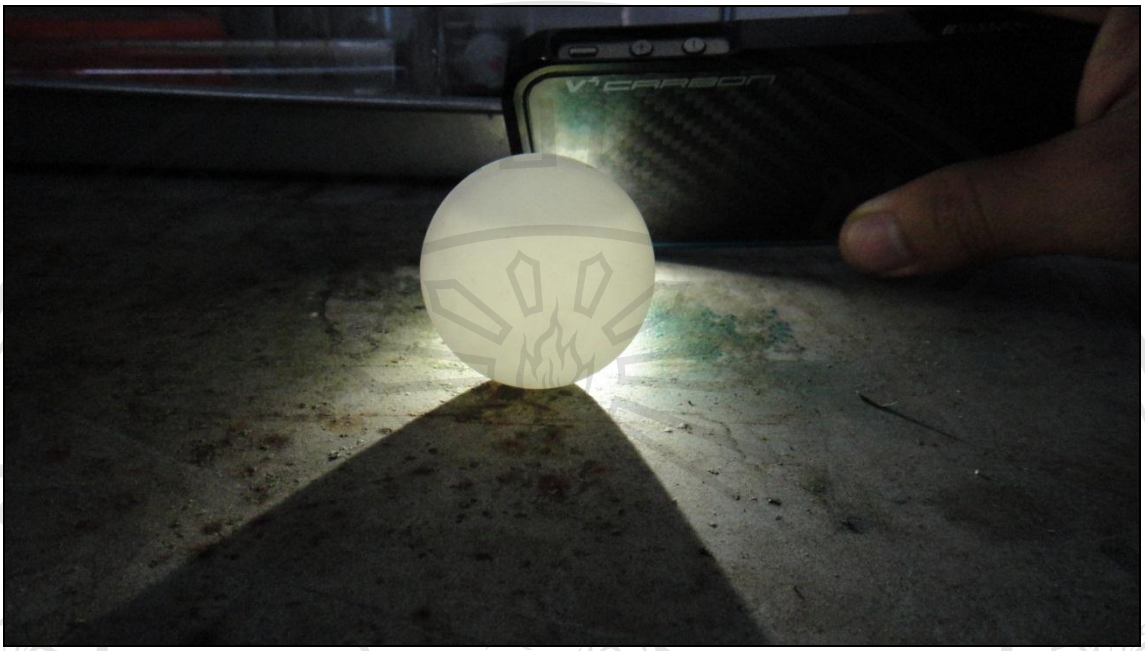


Figure 2.4 The PCM ball used in the PCM bed.

2.3 The Air-Conditioned Testing Room

The air-conditioned testing room with dimensions of 2.4 m x 3.6 m x 2.5 m was constructed as shown in Figures 2.5-2.7. The walls, the ceiling and the floor were made of polystyrene foam (Isowall) with a thickness of 7.5 cm and a density of 1 lb/ft^3 and both sides were covered with galvanized steel and white polyester coating. The room contained 1 unit of 2 TR air-conditioner. Figures 2.8 shows the view of the air-conditioner. Figure 2.9 shows the view inside the tested room and Figure 2.10 shows the PCM bed.

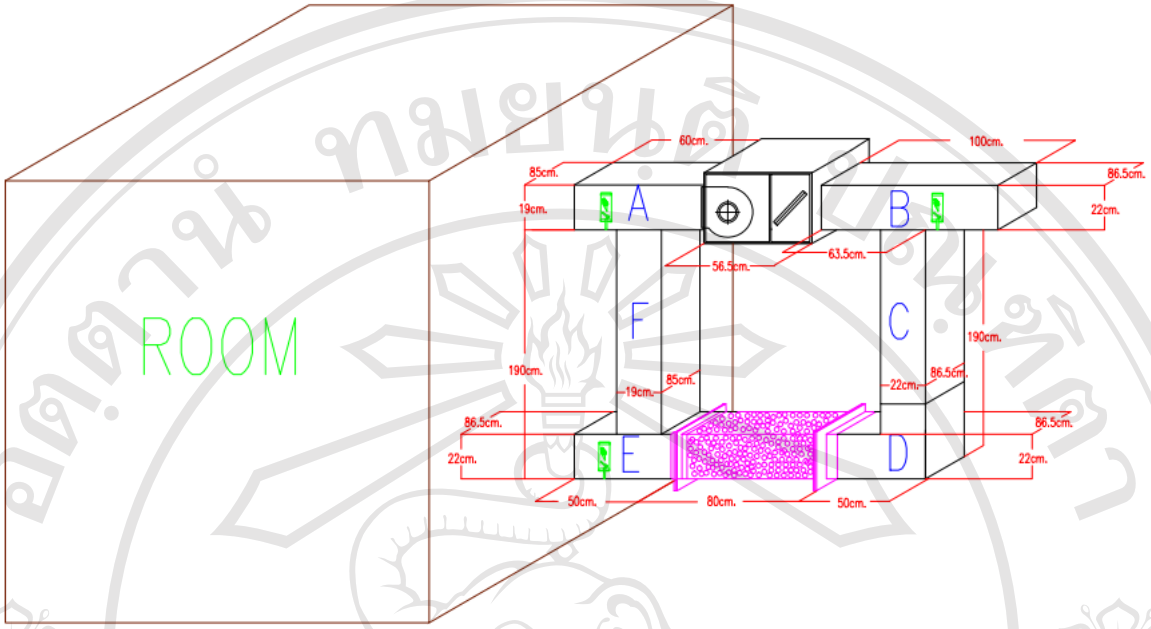


Figure 2.5 Drawing of the testing room and the PCM unit.

Figure 2.6 Front view of the testing room.

Figure 2.7 Side view of the testing room.

Figure 2.8 Air-conditioner installed in the testing room.

Figure 2.9 Inside of the testing room.

Figure 2.10 Installing the PCM bed in the return duct.

2.4 Experimental Procedures

2.4.1 Pressure Drop

The PCM bed was tested its pressure drop with various thicknesses (40, 50 and 60 cm) and number of bypass tubes (5, 10, 15 and 20 tubes). The details of the testing procedures are shown in Figure 2.11. Figure 2.12 shows positions for measuring the air velocity entering the PCM bed.

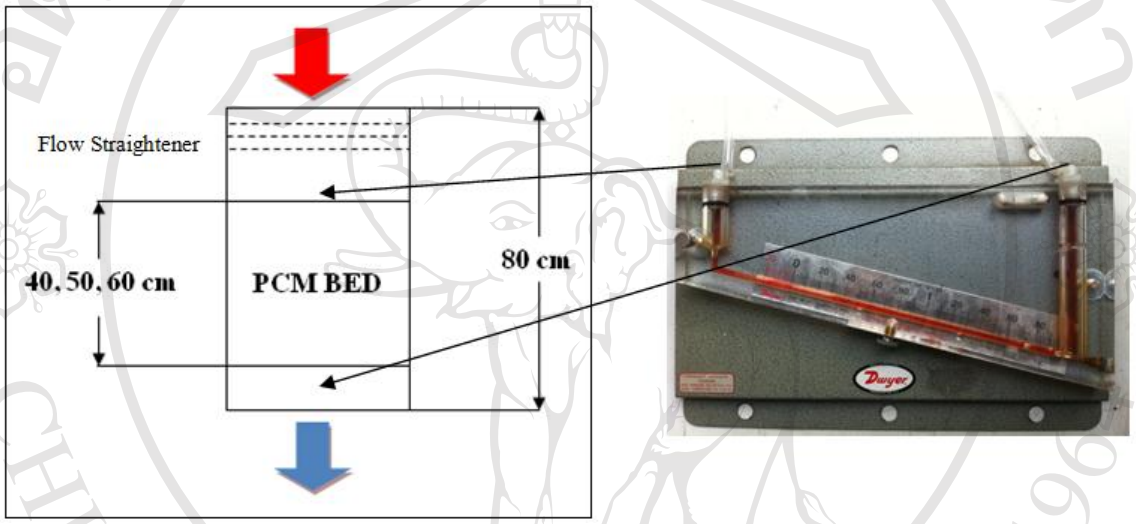


Figure 2.11 The measuring positions of pressure drop of the PCM bed.

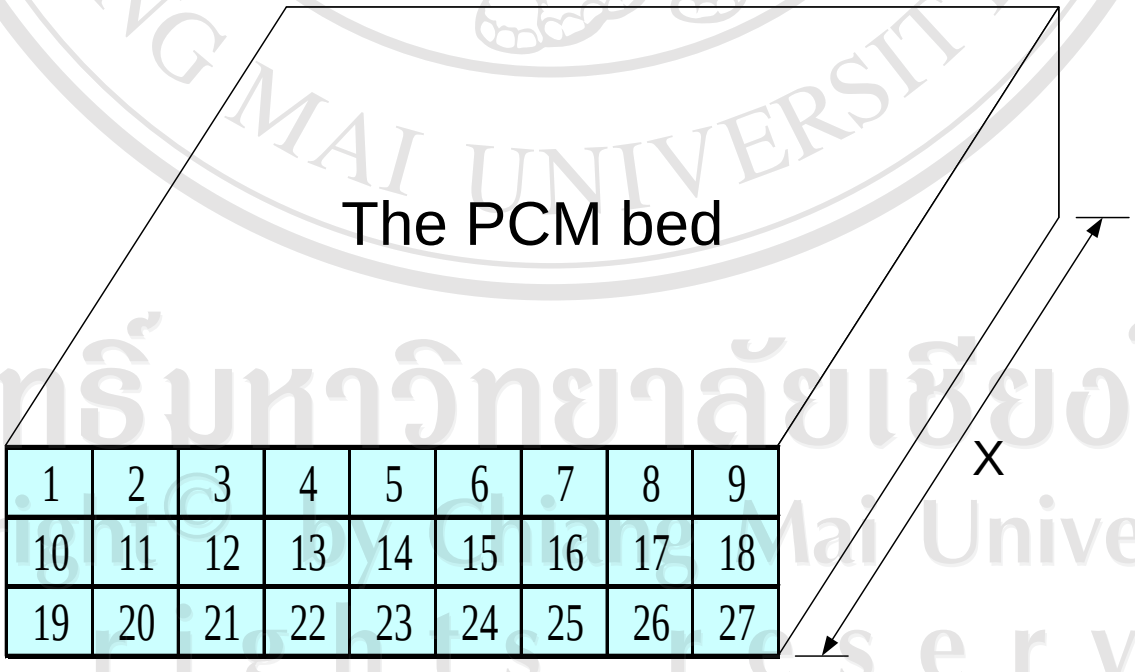


Figure 2.12 The measuring positions of the air velocity for the PCM bed.

2.4.2 Thermal Performance of the Air-Conditioner

The air-conditioner in the tested room was tested its thermal performances and then the results were compared with the unit with the PCM storage. For the latter case, the PCM reduced the return air temperature then the load at the evaporator is reduced. The experiments in each case will be tested for 3 h continuous operation (9:00-12:00 a.m.) each day after PCM solidification.

Figure 2.13 and Figure 2.14 show the measuring positions of the instruments for the normal air-conditioner unit and the modified air-conditioner units, respectively. The details of the instruments are shown in Tables 2.3-2.6. The data will be used to evaluate the cooling load of the air conditioner and its COP.

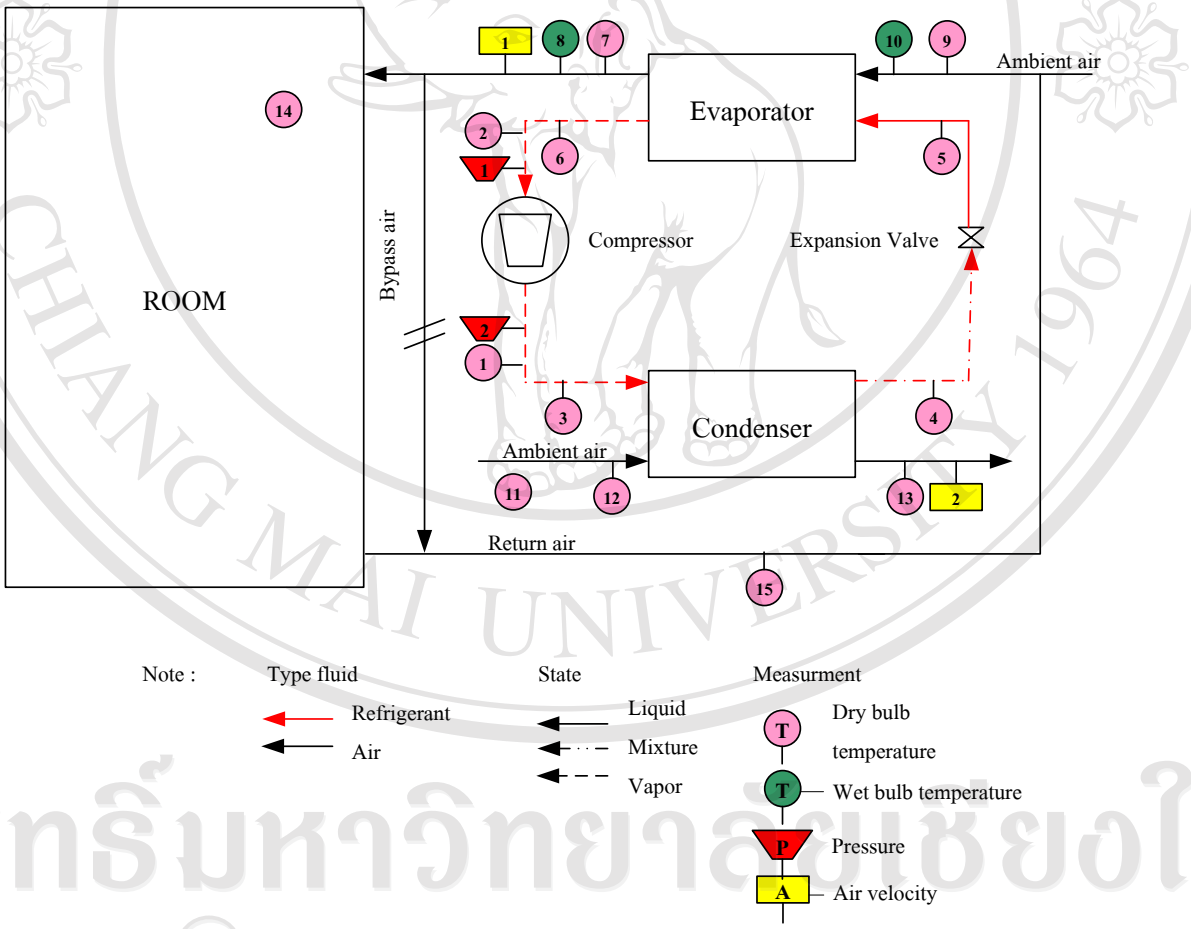


Figure 2.13 Measuring positions of the tested air-conditioner.

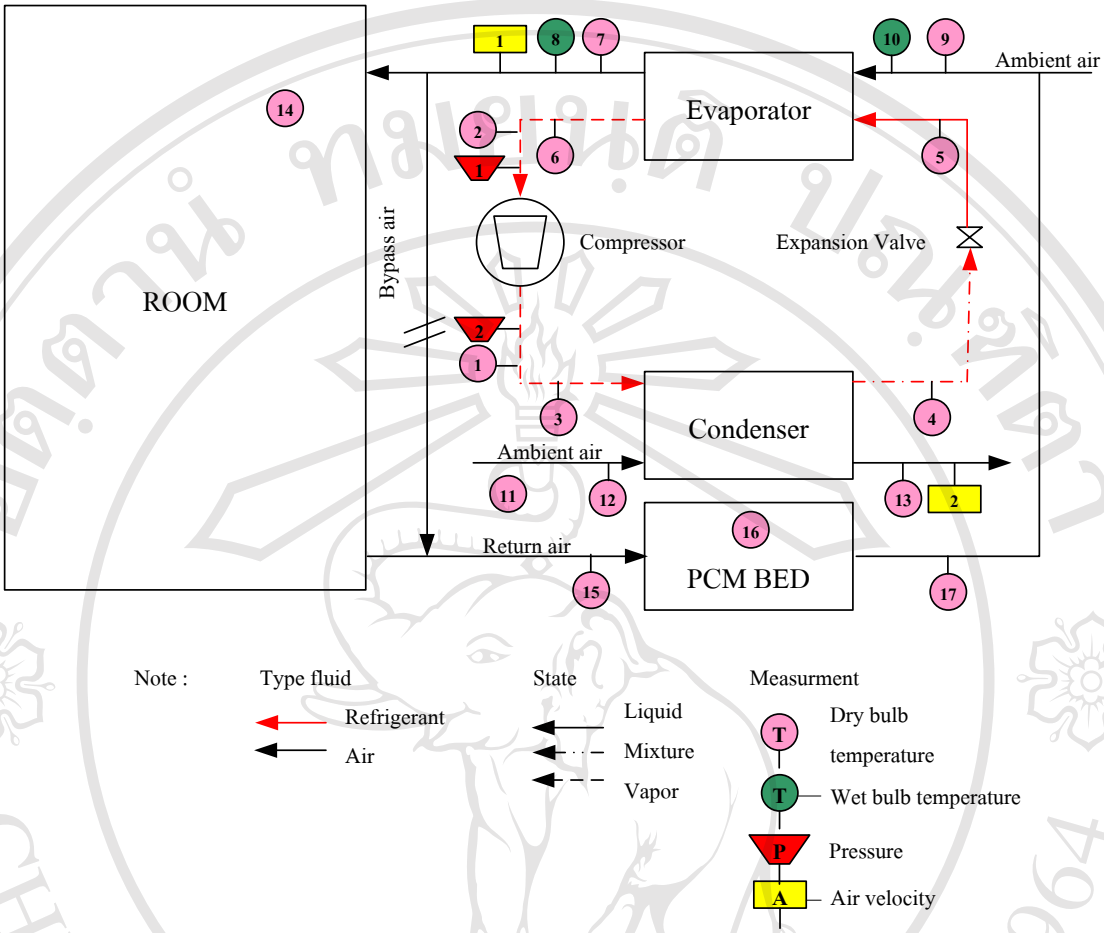


Figure 2.14 Measuring positions of the PCM of the air-conditioner in the experiment.

Table 2.3 Description of the temperature records.

Temperature (°C)	**Position***	**Frequency of Recording**	**Instrument**
1. R-134A leaving compressor (T_1)	Number 1	Record continuously every 5 min for 3 h.	1. Computer 2. Data logger 3. Thermo couple
2. R-134A entering compressor (T_2)	Number 2		
3. R-134A entering condenser (T_3)	Number 3		
4. R-134A leaving condenser (T_4)	Number 4		
5. R-134A entering evaporator (T_5)	Number 5		
6. R-134A leaving evaporator (T_6)	Number 6		
7. Dry bulb air leaving evaporator (T_7)	Number 7		
8. Wet bulb air leaving evaporator (T_8)	Number 8		
9. Dry bulb air entering evaporator (T_9)	Number 9		
10. Wet bulb air leaving evaporator (T_{10})	Number 10		
11. The ambient (T_{11})	Number 11		
12. Dry bulb air entering condenser (T_{12})	Number 12		
13. Dry bulb air leaving condenser (T_{13})	Number 13		
14. Dry bulb air in the room (T_{14})	Number 14		
15. Dry bulb air entering the PCM bed (T_{15})	Number 15		
16. RT-20 in the PCM bed (T_{16})	Number 16		
17. Dry bulb air leaving the PCM bed (T_{16})	Number 17		

*Remark * Positions shown in Figure 2.13 and Figure 2.14*

Table 2.4 Description of the pressure records.

Pressure (psi)	**Position***	**Frequency of Recording**	**Instrument**
1. R-134a entering compressor 1 2. R-134a leaving compressor 1	Number 1 Number 2	Record continuously every 5 min for 1 h.	Pressure gage

*Remark * Positions shown in Positions shown in Figure 2.13 and Figure 2.14*

Table 2.5 Description of air flow rate records.

Flow rate (m/s)	Position *	Frequency of Recording	Instrument
1. Air leaving evaporator 2. Air leaving condenser	Number 1 Number 2	Record continuously every day.	Air velocity meter

*Remark * Positions shown in Positions shown in Figure 2.13 and Figure 2.14*

Table 2.6 Description of the electric power records.

Parameters	Position	Frequency of Recording	Instrument
1. Electric power (kW)	Power supplies at compressor and the system	Record continuously every 5 min for 1 h.	Power meter

CHAPTER 3

Experimental Results

In this chapter, experiment testing results of the normal air-conditioner and the air-conditioner with PCM storage are presented. The results are used to evaluate the thermal performance, the economic analysis of the air-conditioner system with and without PCM storage.

3.1 Pressure Drop

Table 3.1 shows the measuring data of pressure drop between the PCM bed at various thicknesses of PCM bed and the diameter of bypass tube. It could be seen that pressure drops of the bed with and without bypass tubes were nearly the same. Therefore, for our further study, the bed without bypass tubes will be considered. Moreover, the air velocity is rather uniform for the whole cross-section. The results of the air velocity profiles are shown in Table 3.2.

Table 3.1 Pressure drop between the PCM bed for varying the number and the diameter of bypass tube.

Conditions	Pressure drop (in H_2O)		
	Tube 3/8 in	**Tube 6/8 in**	**Tube 1 in**
The number of bypass tube at 0 tube			
X at 40 cm	0.37	-	-
X at 50 cm		0.4	
X at 60 cm			0.42
The number of bypass tube at 5 tube			
X at 40 cm	0.36		
X at 50 cm		0.35	
X at 60 cm			0.36
The number of bypass tube at 10 tube			
X at 40 cm	0.33		
X at 50 cm		0.32	
X at 60 cm			0.3
The number of bypass tube at 15 tube			
X at 40 cm	0.31		
X at 50 cm		0.29	
X at 60 cm			0.25

Note: X is bed thickness as shown in Figure 2.11

Table 3.2 The air velocity leaving the PCM bed at various thickness of the bed.

The air velocity at the measuring positions (m/s)	Bed thickness (X)		
	40 cm	50 cm	60 cm
1	1.2	1.1	1.0
2	2.1	2.0	1.5
3	1.5	1.4	1.5
4	1.6	1.4	1.1
5	1.9	1.0	2.2
6	1.0	1.2	2.5
7	2.0	1.8	2.3
8	1.7	1.8	1.6
9	1.5	1.3	2.8
10	1.8	0.8	2.3
11	1.4	1.6	0.5
12	1.2	1.4	0.7
13	1.2	1.8	0.4
14	1.4	0.8	0.5
15	1.2	1.6	0.6
16	1.2	1.6	0.5
17	1.0	1.3	0.5
18	1.4	1.3	1.3
19	1.1	1.0	0.9
20	1.3	1.2	0.7
21	1.1	1.0	0.9
22	1.3	1.2	0.7
23	1.4	1.3	0.8
24	1.6	1.4	0.7
25	1.2	1.3	0.5
26	1.0	0.7	0.4
27	1.0	0.4	0.7
Average	1.4	1.3	1.1

Note: The measuring positions are shown in Figure 2.12

3.2 Performance Curve of the Normal Air-conditioner

Figure 3.1 shows the cooling energy efficiency ratio, EER_{AC}, of the tested air-conditioner with the temperature difference between the surrounding ambient (T_a) and the room temperature (T_r). It could be seen that as the difference increases, the EER_{AC} drops down and an empirical correlation of these parameters could be fitted as

$$EER_{AC} = - 0.2811(T_a-T_r) + 5.7915. \quad (3.1)$$

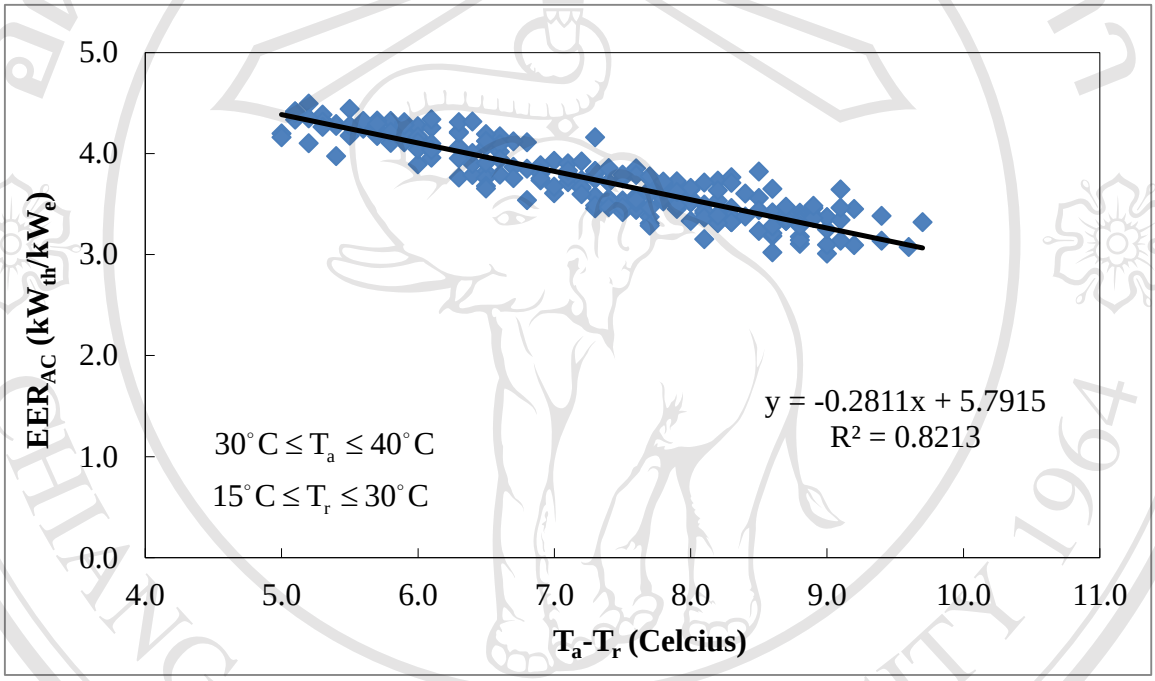


Figure 3.1 Thermal performance curve of the normal air-conditioner.

Figure 3.2 also shows the consumed electrical power of the normal air-conditioner. The value also depends on the temperature of the ambient and that of the air-cooled which is correlated as

$$W_{Comp} = 0.0829\ (T_a - T_r) + 2.7851. \quad (3.2)$$

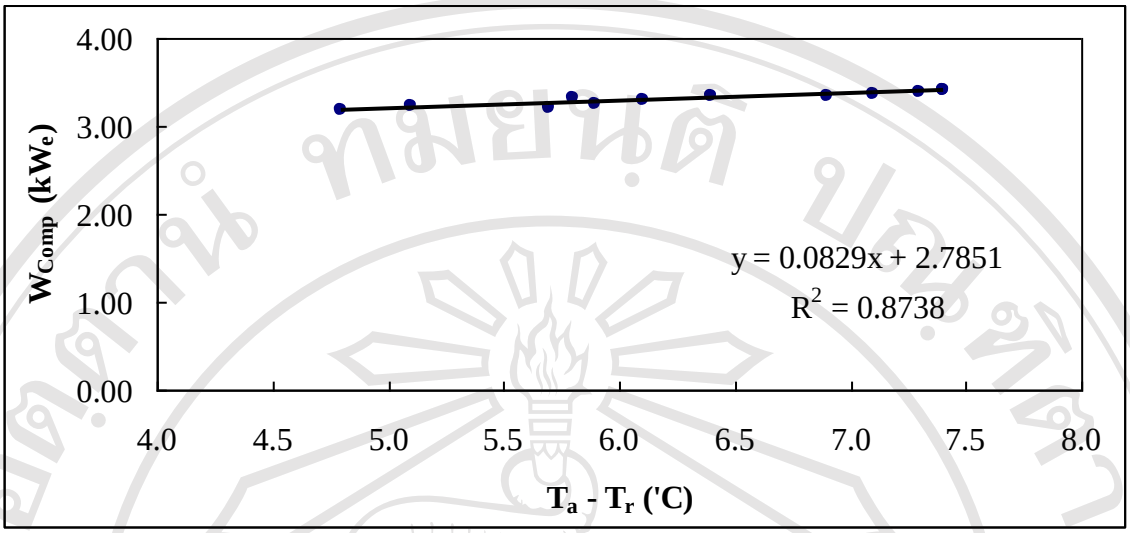


Figure 3.2 Electrical energy consumed by compressor of the air- conditioner.

3.3 Performance Curve of the Modified Air-conditioner

Figure 3.3 shows the temperature profile of the air-conditioner units combined with PCM bed at a thickness of 40 cm. It could be seen that the operating cycle of the modified system could be separated into 3 modes which includes charging mode, discharging mode and steady mode. In charging mode, the supply air from the evaporator at the temperature around 15 ^{o}C was used to cool and solidify the PCM bed during the off-peak period at 6:00-8:00 am around 2 hours for the PCM bed thickness of 40 cm. In discharging mode, the return air at temperature around 25 ^{o}C was fed through the PCM bed and reduced the air temperature ($T_{Air,PCM,o}$) to be around the PCM melting point ($T_{PCM,ave}$) at about 20 ^{o}C. When the air entered the evaporator, it had a lower temperature than the unit without the storage which meant that the cooling load (Q_E) was reduced as shown in Figure 3.4. Thus the electrical power consumption of the air-conditioner could be saved during the on-peak period after 9:00 am around 3 hours for the PCM bed thickness of 40 cm. In steady mode, all the PCM was melted into liquid phase, then the air-conditioning was switched back to the normal air-conditioner to control the air temperature leaving the evaporator to be steady.

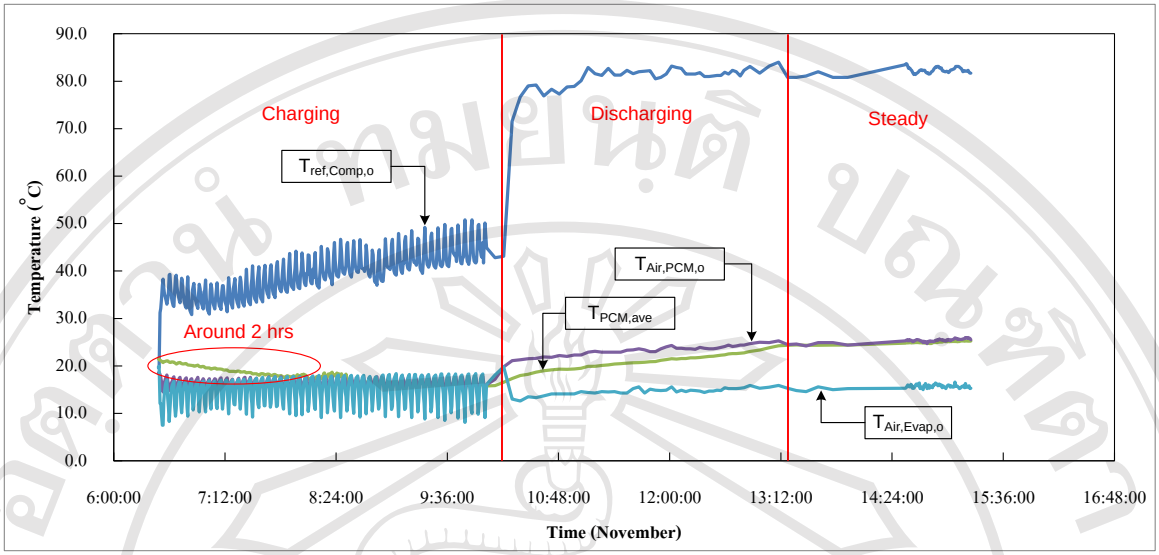


Figure 3.3 Temperature profile of the modified air-conditioner at thickness of the PCM bed at 40 cm.

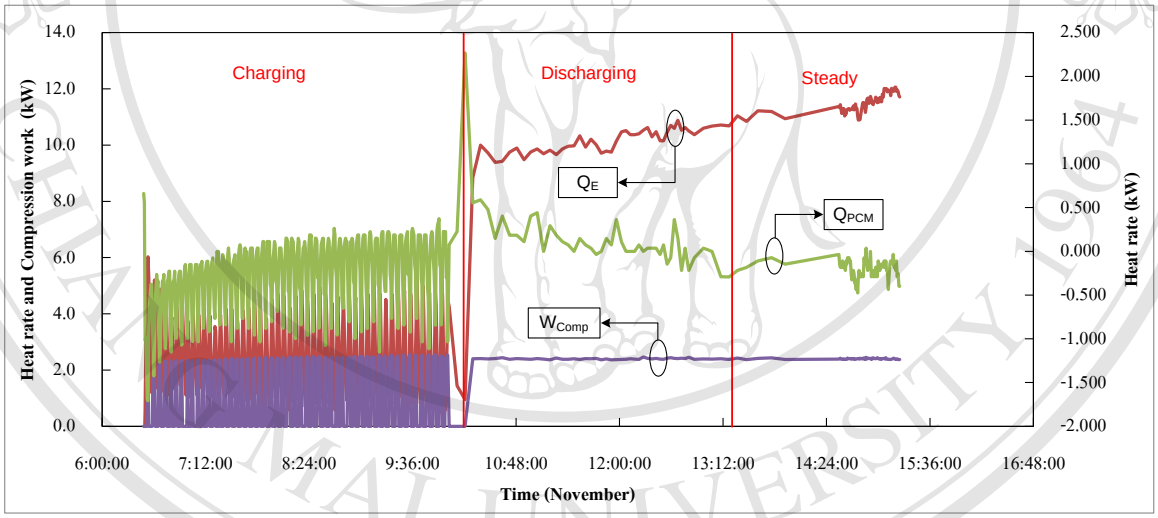


Figure 3.4 Cooling capacity of the modified air-conditioner at thickness of the PCM bed at 40 cm.

Table 3.3 shows the comparison testing results of PCM charging and discharging times with various thicknesses of the PCM bed at 40 cm, 30 cm and 20 cm. The factors for indicating these performances are given in the terms of PCM charging factor and PCM cooling factor, respectively, which are the charging and the discharging periods per unit volume of the PCM. From the table, it could be seen that the charging factor decreases with the increase of the bed thickness and vice versa for the discharging factor. The results are also shown in Figures 3.5 and 3.6.

Table 3.3 Charging and discharging performances of the PCM bed with various thicknesses.

Thickness of the PCM bed	Bed 40 cm	Bed 30 cm	Bed 20 cm
PCM bed			
The number of PCM ball (unit)	1,100	933	619
Volume of PCM (liter)	57.60	48.85	32.41
Charging time (minute)	110	100	70
Discharging time (minute)	180	140	80
PCM cooling factor (minute/liter) *Note: Discharging time/Volume of PCM*	3.13	2.87	2.47
PCM charging factor (minute/liter) *Note: Charging time/Volume of PCM*	1.91	2.05	2.16

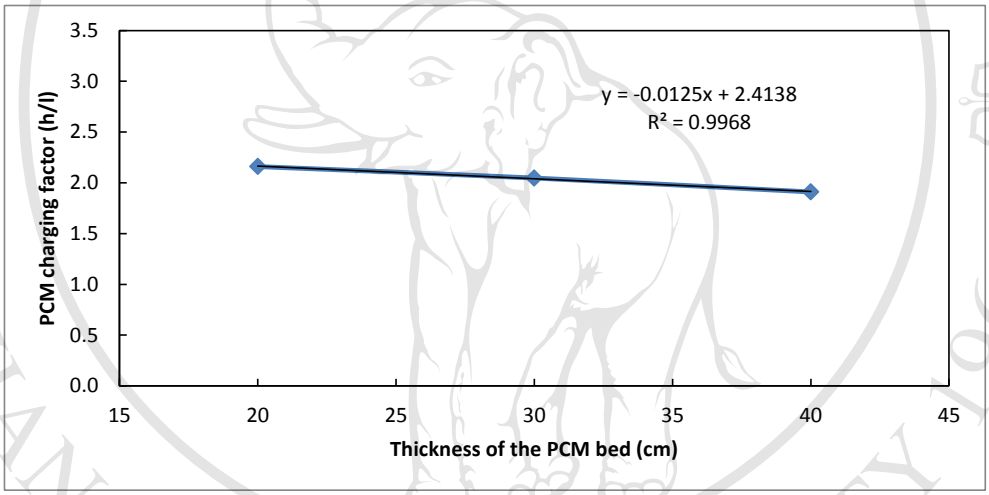


Figure 3.5 Charging curve of the PCM storage.

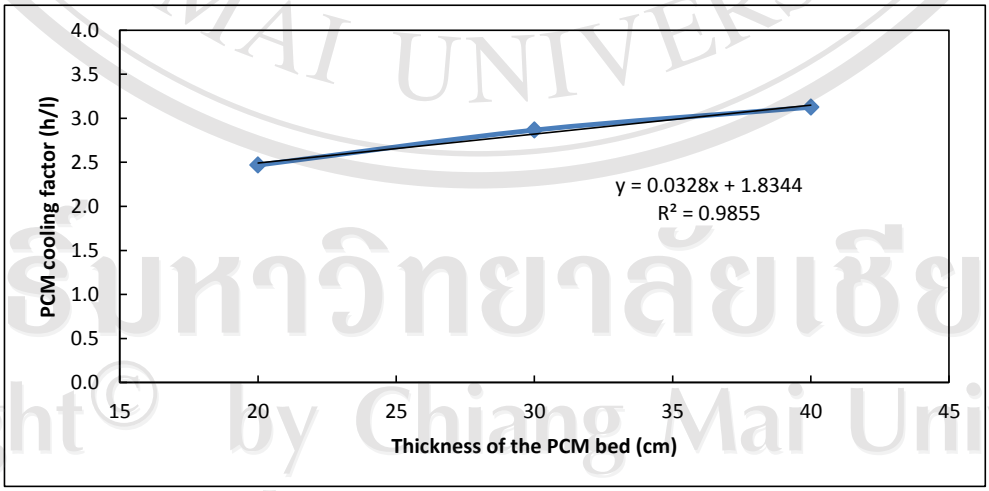


Figure 3.6 Discharging curve of the PCM discharging factor.

Table 3.4 Electrical power consumption of the normal system and the modified system.

Air-conditioner	Operating time (h/d)	Electrical power (kW)	Electrical power consumption (kWh/d)	Electricity cost (Baht/d)
The normal system	12	3.28	39.36	142.66
The modified system				
Charging period	2	0.84	1.68	1.41
Discharging period	3	1.41	4.23	5.96
Steady period	9	3.28	29.52	96.83
Total	14	-	35.42	104.20
Saving			3.94	38.46

Table 3.4 also shows the electrical power consumptions of the air-conditioner with and without the PCM bed assisted. The PCM bed thickness was 40 cm. It could be found that the average daily electrical power consumption could be saved around 3.94 kWh/d from 39.36 kWh/d of the normal air-conditioner. The electricity cost could be saved around 38.46 Baht/d.

CHAPTER 4

Economic Results

Economic result of this study is presented in term of payback period which shows the correlation of the energy saving cost when the PCM is integrated into the air-conditioner system and the expense due to the PCM. Table 4.1 shows the electrical power consumption of the normal system and the modified system of which the general conditions for economic analysis of the systems are:

A. Number of day for hot water production	365	d/y
B. Electricity charge (Time of use rate: TOU) [5]		
Type	household (1.2.2)	
Voltage level of transmission line	< 22	kV
Peak (during 9:00 – 22:00 o'clock)	5.2674	Baht/kWh
Off peak (during 22:00 – 9:00 o'clock)	2.1827	Baht/kWh
Off peak (holiday 0:00 – 24:00 o'clock)	2.1827	Baht/kWh
Ft [6]	0	Baht/kWh
Monthly service	38.22	Baht/kWh·month
C. Operating time		
The normal air-conditioner system	12	h/d
	8.00 – 20.00	o'clock
The modified air-conditioner system	14	h/d
Charging mode	6:00 – 8:00	o'clock
Discharging mode	8.00 – 11.00	o'clock
Steady mode	11.00 – 20.00	o'clock
D. Rubitherm 20 [7]	400	Baht/liter

Table 4.1 shows the comparison results of electrical power consumption between the normal air-conditioner system and the modified air-conditioner system. It could be seen that the electrical power of the normal system was around 39.36 kWh/d compared with around 35.42 kWh/d of the modified system at operating time 12 h and 14 h, respectively. The electrical power saving cost of the modified system was around 38.46

Baht/d or 6,568.49 Baht/y while the PCM cost was around 23,040 Baht at 57.60 liter (400 Baht/liter) and payback period was around 3.51y as shown in Table 4.2.

Table 4.1 The comparison results of electrical power consumption of the normal system and the modified system.

Air-conditioner	Operating time (h/d)	Electrical power (kW)	Electrical power consumption (kWh/d)	Electricity cost (Baht/d)
The normal system	12	3.28	39.36	142.66
The modified system				
Charging period	2	0.84	1.68	1.41
Discharging period	3	1.41	4.23	5.96
Steady period	9	3.28	29.52	96.83
Total	14	-	35.42	104.20
Saving			3.94	38.46

Table 4.2 The economic results of the modified system.

Descriptions	The normal system	The modified system
PCM cost at 57.6 liter (Baht)	0	23,040
Electricity cost per year		
Peak 9.00 – 22.00 o'clock (Baht)	49,548.17	44,412.08
Off peak 22.00 – 9.00 o'clock (Baht)	1,866.52	1,758.40
Holiday 0.00 – 24.00 o'clock (Baht)	8,959.30	8,064.73
Ft (Baht)	0.00	0.00
Monthly service (Baht/y)	458.64	458.64
Vat 7% (Baht)	4,258.28	3,828.57
Total cost per day (Baht/y)	65,090.92	58,522.43
Saving		
Percentage (%)	-	10.09
Cost (Baht/y)	-	6,568.49
Payback period (y)	3.51	

CHAPTER 5

Conclusion

In this study, a concept of using phase change material (PCM) to reduce energy consumption of air-conditioner for air cooling in Thailand was considered. Rubitherm 20 (RT-20) was selected to combine with a 2 TR air-conditioner in the testing room with dimensions of 2.4 m x 3.6 m x 2.5 m. The testing data was used to find out the thermal performances and the electrical power consumption of the normal unit and the modified unit. For the same condition of cooling load, it could be found that the electrical power of the normal system has around 39.36 kWh/d compared with around 35.42 kWh/d which decreases around 3.94 kWh/d. The PCM bed could be saved around 38.46 Baht/d or 6,568.49 Baht/y while the PCM cost is around 23,040 Baht at 57.60 liter for thickness of the PCM bed at 40 cm. The payback period is around 3.51 y.

Table 5.1 shows the scheduling of the study.

Table 5.1 Scheduling of the study.

Activities	month											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	12
1. Design and construct of the experimental setup including the measuring devices and commissioning.	←		→									
2. Experimental work to find out the thermal performances of the normal system relating to the operating conditions.	←					→						
3. Study the effect of the storage size on the PCM solidification and air cooling at various cooling periods				←					→			
4. Consider the economic analysis to find out the appropriate size of the storage.									←		→	
5. Report												↔

Remark : ↔ Output of the Study

NOMENCLATURE

T	Temperature, (°C)
W	Work, (kW)
Q	Heat capacity, (kW)

Subscript

a	Air
ave	Average
Comp	Compressor
Cond	Condenser
db	Dry bulb
e	Electrical power
E	Evaporator
Evap	Evaporator
PCM	Phase change material
th	Thermal
r	Room
ref	Refrigerant
wb	Wet bulb

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APPENDIX

Appendix A. Testing data of the normal air-conditioner

Table A.1 Testing data of the normal air-conditioner.

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
15:31:07	94.30	17.00	92.80	34.40	10.00	17.40	16.30	15.70	24.00	21.30	31.00	29.40	45.00	24.60
15:31:37	94.30	16.60	92.80	34.60	10.20	16.80	15.90	15.60	24.00	21.30	30.50	29.10	44.40	24.40
15:32:07	94.40	16.70	92.90	34.70	10.30	17.50	16.40	15.60	24.30	21.30	31.20	29.40	34.10	23.90
15:32:37	94.40	16.90	92.60	34.60	10.20	17.40	16.20	15.60	23.80	21.20	30.20	29.40	38.70	24.00
15:33:07	94.40	16.90	92.60	34.60	10.20	17.40	16.20	15.60	24.2	21.20	31.00	29.60	32.00	24.20
15:33:37	94.30	15.50	92.70	34.70	10.10	15.80	16.00	15.30	24.00	21.00	30.50	29.30	36.40	23.80
15:34:07	94.30	15.50	92.90	34.90	10.20	15.70	15.90	15.20	24.00	21.00	30.80	29.80	41.90	24.40
15:34:37	94.10	15.30	92.50	34.80	10.10	16.10	15.80	15.10	24.20	21.00	31.40	29.70	37.20	24.50
15:35:07	94.10	16.20	92.40	34.60	9.90	16.70	15.80	15.10	23.80	21.00	30.90	29.00	38.60	24.60
15:35:37	94.10	16.60	92.70	34.60	10.10	16.90	15.90	15.10	23.80	20.90	31.50	29.10	37.30	24.40
15:36:07	94.20	16.50	92.70	34.70	10.10	16.80	15.80	15.10	24.20	20.90	31.20	29.30	33.90	24.00
15:36:37	94.10	16.90	92.70	34.30	10.10	17.30	16.00	15.20	23.60	21.00	30.40	29.50	38.40	23.40
15:37:07	94.20	16.50	92.80	34.50	10.20	16.50	15.90	15.30	23.80	21.00	30.90	29.00	34.70	23.30
15:37:37	94.20	16.20	92.70	34.50	10.00	16.80	15.90	15.20	23.80	20.90	30.60	29.10	35.00	23.20
15:38:07	94.20	16.50	92.50	34.40	10.10	17.00	15.90	15.20	23.60	20.90	31.20	29.30	35.10	23.30
15:38:37	94.30	16.50	92.70	34.60	10.00	16.60	15.80	15.10	23.50	20.90	32.00	29.20	36.90	23.70
15:39:07	94.20	15.70	92.70	34.80	10.30	16.10	15.70	15.00	23.30	20.80	31.50	29.60	37.50	23.60
15:39:37	94.00	15.90	92.60	34.70	10.10	16.60	15.70	15.00	24.00	20.80	30.70	29.10	35.50	23.40

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
15:40:07	94.00	16.10	92.60	34.50	10.00	16.80	15.80	15.00	23.30	20.80	30.80	29.20	35.40	23.60
15:40:37	94.10	16.30	92.60	34.60	9.90	16.50	15.70	15.00	23.10	20.60	31.30	29.10	33.60	23.40
15:41:07	94.00	15.90	92.60	34.60	9.90	16.40	15.60	15.00	23.20	20.80	31.30	29.80	36.10	23.40
15:41:37	94.00	15.90	92.60	34.50	10.10	16.80	15.70	14.90	23.40	20.70	30.40	29.10	39.40	23.20
15:42:07	94.00	16.40	92.60	34.20	9.80	16.90	15.70	15.00	23.50	20.80	30.30	29.10	34.50	22.80
15:42:37	94.00	16.80	92.70	34.10	9.80	17.30	15.70	15.00	23.20	20.70	30.50	29.00	40.40	23.30
15:43:07	94.00	16.50	92.40	34.20	9.80	16.60	15.70	15.00	23.20	20.70	30.60	29.20	42.00	23.30
15:43:37	94.00	15.80	92.50	34.00	9.80	16.60	15.70	14.80	23.40	20.60	30.40	29.30	38.40	23.30
15:44:07	94.00	16.10	92.80	34.20	10.00	16.80	15.90	15.10	23.50	20.70	30.90	29.00	35.60	23.50
15:44:37	94.20	15.30	92.70	34.50	8.80	15.70	15.70	15.10	23.10	20.70	30.50	29.70	37.90	23.10
15:45:07	93.80	13.60	91.90	34.50	8.20	14.60	15.20	14.80	23.00	20.60	30.90	29.80	38.70	23.00
15:45:37	93.70	14.80	92.30	34.50	8.20	16.20	15.40	14.80	22.70	20.50	31.00	29.20	38.80	23.50
15:46:07	93.70	16.10	91.90	33.90	8.30	17.30	15.90	14.90	23.20	20.60	30.60	28.50	38.50	22.50
15:46:37	93.50	16.50	92.10	33.80	8.10	17.00	15.80	14.80	23.20	20.60	31.20	29.90	39.50	22.70
15:47:07	93.40	14.80	92.10	34.60	8.90	12.90	15.70	14.90	22.90	20.60	30.70	28.90	36.10	22.90
15:47:37	92.90	13.90	92.00	34.40	8.50	15.60	15.50	14.90	22.90	20.50	30.80	28.70	37.20	22.80
15:48:07	93.20	15.50	92.10	34.00	8.30	16.10	15.20	14.70	23.00	20.40	30.70	28.70	37.80	23.00
15:48:37	93.10	14.90	92.10	34.00	8.30	15.20	15.40	14.60	22.90	20.30	30.60	29.20	36.80	22.50
15:49:07	93.20	14.50	92.10	33.70	8.90	13.70	15.40	14.80	22.70	20.20	31.00	29.20	35.40	22.60
15:49:37	93.00	12.90	91.70	33.40	8.40	13.50	15.20	14.80	22.60	20.10	30.50	28.90	35.30	22.10
15:50:07	92.70	11.70	91.50	33.20	8.40	11.20	15.10	14.60	22.50	20.00	29.90	29.40	39.00	22.60

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
15:50:37	92.20	9.40	91.00	33.30	8.60	12.00	14.90	14.50	22.40	19.90	31.00	28.80	33.60	22.80
15:51:07	91.70	9.70	90.50	33.50	8.60	12.30	15.00	14.40	22.40	19.80	30.80	28.90	33.50	22.60
15:52:07	91.30	12.70	90.00	33.40	8.00	15.2	15.00	14.40	22.50	20.00	30.60	28.80	36.30	22.80
15:52:37	91.30	14.00	89.90	33.10	8.10	15.30	15.40	14.50	22.50	20.20	30.30	28.40	39.70	23.20
15:53:07	91.20	14.40	89.80	33.00	6.40	15.90	15.30	14.40	22.40	20.30	29.90	28.70	34.90	22.70
15:53:37	91.10	13.70	89.90	33.10	5.80	15.10	15.10	14.50	22.70	20.30	29.50	28.60	34.00	22.50
15:54:07	91.10	13.50	89.80	33.30	-5.80	14.80	15.30	14.40	23.10	20.30	30.30	28.80	40.20	22.70
15:54:37	91.10	14.10	89.80	33.00	-1.50	16.30	15.00	14.50	22.50	20.40	30.50	28.50	35.20	23.00
15:55:07	91.20	14.70	90.00	32.90	-4.20	16.10	15.20	14.50	22.60	20.30	30.20	28.40	37.90	22.90
15:55:37	91.20	13.70	90.00	33.00	-2.80	14.40	15.20	14.50	22.50	20.30	30.50	29.10	41.20	23.00
15:56:07	91.10	12.60	89.80	33.10	8.40	13.60	15.20	14.50	22.70	20.40	30.70	28.60	43.50	23.10
15:56:37	91.10	13.10	89.80	33.00	6.70	15.60	15.20	14.50	22.90	20.40	30.50	28.80	31.70	22.80
15:57:07	91.10	11.90	89.90	33.50	9.70	12.10	15.20	14.50	22.50	20.40	30.60	29.00	45.70	23.00
15:57:37	90.70	10.20	89.50	32.90	6.40	14.10	15.20	14.60	22.70	20.40	30.30	28.20	39.30	23.00
15:58:07	90.50	12.50	89.30	32.70	8.70	12.90	15.10	14.50	22.40	20.40	29.80	28.50	35.80	23.20
15:58:37	90.40	11.70	89.20	32.80	7.70	12.60	15.00	14.50	22.50	20.50	30.50	28.80	33.50	22.80
15:59:07	90.30	11.70	89.10	32.80	8.40	13.80	15.20	14.50	22.50	20.50	30.50	28.60	34.70	22.50
16:00:07	89.90	6.20	88.60	33.10	5.40	10.70	14.40	14.30	21.80	20.00	30.60	28.80	47.20	20.40
16:00:37	89.20	6.00	87.9	33.10	7.00	10.8	13.90	13.90	21.60	19.50	29.70	28.90	41.80	21.70
16:01:07	88.50	5.80	87.40	32.70	7.60	10.10	13.40	13.50	20.90	19.10	30.40	28.60	33.10	19.40
16:01:37	88.00	5.50	86.80	32.90	4.50	9.50	13.50	13.20	21.40	18.70	30.30	28.40	35.10	20.90

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
16:02:37	87.10	7.40	85.80	32.70	11.40	11.00	14.30	13.30	22.00	18.80	29.70	28.50	42.20	22.40
16:03:07	87.10	9.60	85.90	32.90	6.50	12.90	14.80	13.60	22.20	19.30	30.60	28.60	33.80	23.20
16:03:37	87.20	12.00	85.90	32.90	9.00	13.5	15.10	13.90	22.50	19.80	30.00	28.50	31.70	23.00
16:04:07	87.50	13.30	86.20	33.00	9.80	16.20	15.50	14.30	22.50	19.80	30.00	28.50	31.70	23.00
16:04:37	87.90	13.50	86.50	33.00	9.60	14.30	15.30	14.60	22.60	20.30	29.80	28.70	34.40	22.40
16:05:07	88.20	12.80	86.80	32.90	7.00	13.5	15.30	14.60	22.70	20.30	30.40	28.70	41.70	22.60
16:05:37	88.30	12.50	87.10	33.20	9.40	14.00	15.30	14.60	22.40	20.40	30.40	28.90	39.60	22.60
16:06:07	88.40	12.10	87.20	33.00	9.90	14.60	15.70	14.70	22.30	20.30	29.70	28.40	32.90	22.60
16:06:37	88.80	13.90	87.30	32.80	9.70	15.00	15.30	14.80	22.70	20.30	29.50	28.80	32.70	22.40
16:07:07	89.00	11.90	87.60	33.00	9.80	13.00	15.50	14.70	22.50	20.30	30.30	28.50	37.00	22.60
16:07:37	88.90	11.70	87.70	32.90	9.60	14.40	15.30	14.80	22.20	20.30	29.80	28.70	36.00	22.00
16:08:07	89.00	12.30	87.70	33.00	9.50	11.90	15.30	14.70	21.90	20.20	30.10	28.70	34.90	22.00
16:08:37	89.00	9.90	87.70	32.90	9.20	11.50	15.10	14.60	21.40	20.00	29.80	28.50	39.20	20.80
16:09:07	88.70	5.80	87.50	32.70	8.50	10.10	14.10	14.30	20.60	19.40	29.70	28.60	35.10	20.80
16:09:37	88.20	5.00	86.9	33.00	7.70	9.10	13.40	13.70	19.90	18.60	30.50	28.90	41.80	20.40
16:12:07	84.80	5.40	83.50	33.00	7.80	9.40	13.20	12.40	20.60	17.60	30.00	28.70	36.30	20.10
16:12:37	84.50	5.50	83.30	33.10	8.30	9.20	13.10	12.60	20.20	17.80	29.70	29.00	34.60	20.20
16:13:07	84.40	5.60	83.30	33.20	8.30	9.30	13.40	12.50	20.60	17.80	29.50	29.20	39.70	20.00
16:13:37	84.20	5.70	83.00	33.00	8.40	9.60	13.20	12.60	20.30	17.90	30.50	29.10	38.40	19.80
16:14:07	84.10	5.80	82.80	32.90	8.30	10.30	13.40	12.70	19.90	18.00	30.20	28.50	41.20	19.40
16:14:37	84.10	7.20	82.90	32.70	8.40	9.90	13.30	12.70	20.50	18.00	30.20	28.20	43.60	20.00

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
16:15:07	84.40	8.60	83.30	32.60	8.40	9.90	13.50	12.80	20.00	18.10	30.20	28.50	39.40	19.50
16:15:37	84.50	5.20	83.30	32.90	8.30	9.10	13.10	12.80	19.50	18.00	29.70	28.70	37.20	18.80
16:16:07	84.20	4.60	83.00	32.80	7.70	8.20	12.50	12.50	19.20	17.60	29.80	28.20	40.20	18.60
16:16:37	84.10	4.90	82.90	32.60	7.70	7.80	12.50	12.30	19.90	17.40	29.60	28.50	43.70	20.00
16:20:07	85.50	9.70	84.20	32.70	8.80	12.60	14.40	13.80	20.80	19.00	29.80	28.50	36.80	20.90
16:20:37	85.80	11.20	84.60	32.60	9.20	12.90	14.40	13.90	20.60	19.20	30.30	28.30	35.10	20.50
16:21:07	85.80	11.20	84.60	32.60	9.20	12.90	14.40	13.90	20.2	19.10	29.60	28.40	40.30	20.20
16:21:37	86.20	6.60	84.90	32.60	8.80	10.30	14.10	13.70	20.80	18.80	30.40	28.50	42.60	19.90
16:22:07	86.10	6.00	84.8	32.90	8.70	10.40	13.80	13.60	20.10	18.60	30.70	28.90	40.80	19.70
16:22:37	86.00	5.60	84.80	33.00	8.60	10.00	13.60	13.40	19.90	18.30	30.20	29.30	38.70	19.80
16:23:07	85.70	5.50	84.40	33.20	8.40	9.60	13.50	13.20	19.90	18.20	30.40	29.10	36.80	20.00
16:23:37	85.40	5.60	84.10	33.30	8.50	9.60	13.40	13.00	20.10	17.90	30.20	28.90	37.30	20.30
16:24:07	84.90	6.40	83.70	33.10	8.60	10.60	13.60	13.00	20.40	18.00	30.40	28.80	36.30	19.90
16:24:37	85.10	9.30	83.80	32.90	9.00	11.9	14.40	13.10	20.90	18.50	30.00	28.50	40.80	20.90
16:25:07	85.30	10.70	84.10	32.80	9.10	11.00	14.40	13.40	20.90	18.70	30.30	28.40	32.10	20.90
16:25:37	85.70	10.50	84.40	32.80	9.30	12.50	14.40	13.70	21.00	19.00	30.20	28.60	37.80	21.10
16:26:07	85.90	10.60	84.70	32.90	9.30	12.00	14.80	13.70	21.10	19.10	30.30	28.60	38.80	21.30
16:26:37	86.20	9.70	85.00	32.90	9.40	11.70	14.60	13.90	20.90	19.30	30.40	29.00	35.50	21.20
16:27:07	86.20	7.30	85.00	33.30	9.50	11.90	14.60	13.90	20.80	19.20	30.20	28.50	38.30	21.00
16:27:37	86.40	9.70	85.10	33.10	9.30	12.40	14.60	14.10	21.30	19.40	30.30	28.80	37.10	21.50
16:28:07	86.70	11.90	85.50	32.80	9.50	13.90	14.80	14.10	21.40	19.30	30.30	28.70	35.40	21.70

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
16:28:37	86.70	11.90	85.50	32.80	9.50	13.90	14.80	14.10	21.7	19.70	30.70	28.80	40.70	21.70
16:29:07	87.50	11.90	86.20	33.00	9.80	12.80	15.00	14.40	21.30	19.80	30.40	29.20	35.00	21.60
16:29:37	87.60	9.90	86.40	33.20	9.80	12.40	14.80	14.40	21.60	19.70	30.70	28.90	40.30	21.70
16:30:07	87.70	8.70	86.50	33.40	9.60	12.10	14.80	14.40	21.50	19.70	30.80	29.80	34.80	21.90
16:30:37	87.80	7.20	86.50	33.80	9.80	11.80	15.00	14.30	21.90	19.70	31.00	30.10	39.90	22.00
16:31:07	87.70	7.90	86.40	33.70	9.80	11.80	14.90	14.30	21.90	19.70	30.90	29.80	41.50	22.20
16:31:37	87.60	10.00	86.40	33.50	9.60	12.80	14.80	14.30	21.60	19.60	30.50	29.00	39.20	21.70
16:32:07	87.80	12.10	86.70	33.30	9.60	12.70	14.90	14.20	21.90	19.80	30.30	28.60	38.40	22.00
16:32:37	88.20	12.40	86.80	33.00	9.60	13.20	14.90	14.30	21.80	19.80	30.20	29.00	35.40	21.70
16:33:07	88.30	10.70	87.00	33.20	9.80	12.60	15.00	14.30	21.70	19.70	30.60	28.90	36.80	21.90
16:33:37	88.30	10.00	87.20	33.30	9.90	12.30	15.10	14.30	21.70	19.90	30.40	29.40	37.70	22.10
16:34:07	88.40	10.30	87.10	33.70	9.90	12.30	15.20	14.40	21.70	19.90	30.60	29.60	37.50	22.00
16:34:37	88.50	10.60	87.20	33.30	9.70	12.10	14.90	14.40	21.60	19.80	30.30	29.50	36.30	21.70
16:35:07	88.50	9.10	87.20	33.50	9.60	12.10	14.70	14.30	21.30	19.70	29.80	29.30	37.40	21.30
16:35:37	88.30	6.90	87.10	33.30	9.30	11.50	14.70	14.20	21.50	19.50	30.50	29.10	40.40	20.60
16:36:07	88.10	6.40	86.90	33.50	9.00	11.3	14.20	13.90	20.60	19.10	30.70	28.90	34.40	20.50
16:36:37	87.80	6.20	86.60	33.70	8.90	10.90	13.90	13.70	20.50	18.80	30.40	29.60	41.20	20.00
16:37:07	87.50	5.90	86.30	33.50	8.80	9.90	13.90	13.50	20.60	18.60	30.90	29.40	37.80	20.40
16:37:37	87.00	6.20	85.90	33.70	8.90	10.20	13.80	13.30	20.50	18.40	30.80	29.50	34.80	20.70
16:38:07	86.70	7.40	85.70	33.50	9.10	11.50	14.10	13.30	21.10	18.70	30.80	29.20	36.40	21.20
16:38:37	86.80	10.70	85.60	33.20	9.10	13.30	14.30	13.40	21.30	19.00	30.80	29.10	39.90	21.50

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
16:39:07	87.10	10.50	85.70	33.30	9.50	11.60	14.80	13.60	21.70	19.30	30.00	29.60	41.60	21.70
16:39:37	86.90	7.60	85.80	33.50	9.50	11.30	14.60	13.80	21.50	19.40	30.40	29.30	39.50	21.50
16:40:07	87.00	8.70	85.90	33.50	9.30	11.20	14.40	13.80	21.50	19.40	30.70	29.50	38.50	21.60
16:40:37	87.30	9.20	86.10	33.70	9.40	11.50	14.50	14.00	21.30	19.40	30.90	29.30	38.10	21.60
16:41:07	87.20	7.90	86.10	33.70	9.50	11.40	14.60	13.90	21.40	19.30	30.70	29.20	36.70	21.70
16:41:37	87.30	8.40	86.10	33.90	9.50	12.20	14.40	14.00	21.40	19.40	30.50	29.40	35.60	21.50
16:42:07	87.50	7.80	86.10	34.00	9.60	11.20	14.60	14.00	21.60	19.30	30.20	30.40	36.50	21.60
16:42:37	87.40	7.50	86.10	34.00	9.60	11.60	14.80	14.00	21.50	19.30	30.20	29.40	36.40	21.80
16:43:07	87.40	9.00	86.2	34.00	9.60	13.10	14.80	14.00	21.70	19.40	30.60	29.30	39.40	21.80
16:43:37	87.50	10.50	86.30	33.90	9.80	11.70	14.70	14.10	21.50	19.50	31.10	29.30	34.90	21.80
16:44:07	87.50	10.50	86.30	33.90	9.80	11.70	14.70	14.10	21.7	19.50	30.30	29.30	34.20	22.00
16:44:37	87.80	10.30	86.50	33.90	9.70	12.10	14.70	14.30	21.60	19.50	30.40	28.90	38.60	21.80
16:45:07	88.00	9.50	86.80	33.90	9.80	12.00	14.70	14.20	21.90	19.50	30.60	29.30	35.10	21.90
16:45:37	88.00	9.50	86.80	33.90	9.90	12.10	14.90	14.30	22.10	19.50	30.40	29.50	39.90	22.40
16:46:07	88.10	10.10	86.90	34.10	10.00	12.40	15.10	14.30	22.40	19.90	31.10	29.70	34.90	22.60
16:46:37	88.20	11.60	86.80	34.00	10.00	14.80	15.10	14.40	22.10	19.80	30.40	29.30	36.90	22.20
16:47:07	88.50	11.90	87.30	34.10	10.10	12.70	15.20	14.50	22.40	20.00	31.30	29.70	42.00	22.50
16:47:37	88.50	10.70	87.30	33.90	10.10	13.20	15.20	14.50	22.30	20.10	31.10	29.20	40.10	22.40
16:48:07	88.70	12.80	87.40	33.90	10.10	14.60	15.20	14.60	22.30	20.10	31.00	29.40	37.80	22.40
16:48:37	89.00	13.00	87.80	33.90	10.30	13.70	15.50	14.80	22.50	20.40	31.00	29.60	36.30	22.70
16:49:07	89.30	13.20	88.00	34.00	10.40	14.30	15.60	14.90	22.20	20.50	30.60	29.80	39.90	22.40

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
16:49:37	89.40	12.70	88.20	34.10	10.40	13.00	15.60	15.00	22.30	20.50	30.80	29.60	38.80	22.60
16:50:07	89.40	12.70	88.20	34.10	10.40	13.00	15.60	15.00	22.5	20.60	31.20	29.70	44.80	22.60
16:50:37	89.80	13.10	88.60	34.10	10.20	13.40	15.70	15.00	22.30	20.50	31.40	30.00	36.80	22.50
16:51:07	89.90	12.80	88.70	33.90	10.20	14.10	15.40	15.00	22.10	20.50	31.40	29.70	39.70	22.20
16:51:37	90.00	11.80	88.70	34.00	10.20	12.40	15.40	15.00	22.40	20.40	30.20	29.50	33.70	22.70
16:52:07	90.00	9.60	88.60	34.10	10.20	12.60	15.20	14.80	22.40	20.20	30.60	30.20	39.00	22.40
16:52:37	89.80	9.10	88.50	34.20	10.00	12.40	15.00	14.60	22.40	20.20	30.90	30.60	36.60	22.70
16:53:07	89.70	8.30	88.30	34.40	10.00	12.20	15.20	14.50	22.70	20.10	31.00	30.00	36.00	22.70
16:53:37	89.50	8.70	88.20	34.40	9.90	12.30	15.00	14.40	22.40	20.00	31.10	31.00	36.80	22.80
16:54:07	89.50	8.70	88.20	34.40	9.90	12.30	15.00	14.40	22.5	20.10	31.60	30.80	38.10	22.50
16:54:37	89.20	8.90	88.00	34.70	10.00	12.00	15.10	14.50	22.40	20.00	31.60	30.40	37.00	22.50
16:55:07	89.40	11.20	87.90	34.40	9.90	11.40	14.80	14.40	22.60	20.00	31.10	30.70	38.50	22.40
16:55:37	89.30	7.40	88.10	34.50	9.90	11.00	14.80	14.30	22.20	19.90	31.30	30.10	37.10	22.60
16:56:07	89.00	7.10	87.80	34.70	9.60	10.70	14.60	14.20	22.20	19.70	31.60	30.70	39.70	22.30
16:56:37	88.80	7.10	87.50	34.60	9.40	10.60	14.50	14.00	22.00	19.50	30.80	31.20	36.00	22.20
16:57:07	88.50	7.10	87.30	34.50	9.40	11.20	14.60	13.90	22.00	19.30	31.10	29.20	41.70	22.30
16:57:37	88.50	8.70	87.20	34.10	9.40	10.50	14.30	13.80	21.60	19.20	31.40	30.50	35.90	21.40
16:58:07	88.30	6.50	87.00	34.40	9.30	10.60	14.30	13.80	21.70	19.10	31.50	30.50	40.50	21.90
16:58:37	88.00	7.30	86.80	34.30	9.40	11.50	14.50	13.70	21.70	19.10	30.80	29.60	38.10	21.40
16:59:07	88.00	8.50	86.80	34.40	9.50	11.20	14.40	13.80	21.70	19.10	31.40	30.00	41.30	21.50
16:59:37	88.00	9.00	86.8	34.30	9.50	11.20	14.40	13.80	21.70	19.10	30.80	29.20	38.30	21.40

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
17:00:07	88.10	7.80	86.80	34.20	9.60	11.30	14.60	13.80	21.70	19.10	31.40	30.00	36.10	21.90
17:00:37	87.90	7.10	86.70	34.90	9.70	11.50	14.40	13.80	21.70	19.10	31.20	30.40	39.80	21.80
17:01:07	87.80	7.90	86.60	35.10	9.80	10.70	14.70	13.80	21.80	19.20	31.30	30.40	38.80	21.70
17:01:37	87.90	8.50	86.60	34.70	9.50	10.80	14.30	13.80	21.60	19.10	30.60	30.30	38.60	21.30
17:02:07	87.80	6.70	86.60	34.70	9.30	10.70	14.10	13.70	21.60	19.10	30.70	30.30	35.80	21.60
17:02:37	87.70	7.90	86.50	34.40	9.20	10.40	14.10	13.50	21.20	18.80	31.00	30.00	36.70	21.40
17:03:37	87.60	6.50	86.30	34.90	9.30	10.10	14.00	13.40	21.60	18.70	31.00	30.60	39.20	21.60
17:04:07	87.20	6.50	86.00	35.00	9.20	9.90	13.80	13.30	21.60	18.70	31.60	29.80	37.80	21.40
17:04:37	87.00	8.20	85.90	34.50	9.20	10.90	14.10	13.20	21.50	18.70	31.40	30.50	39.80	21.90
17:05:07	87.10	9.10	85.80	34.10	9.10	10.10	14.10	13.20	21.20	18.70	29.90	30.20	36.20	21.80
17:05:37	87.10	6.90	85.90	34.20	9.20	10.40	13.90	13.30	21.20	18.70	30.70	29.60	41.50	21.50
17:06:07	87.10	7.50	85.70	34.10	9.20	10.40	14.20	13.40	21.60	18.80	30.50	30.30	39.50	21.50
17:06:37	87.10	6.90	85.80	34.50	9.50	10.80	14.40	13.50	21.70	18.90	31.00	29.80	36.90	22.10
17:07:07	87.00	8.80	85.80	34.40	9.60	12.00	14.40	13.60	21.90	19.20	31.10	29.70	41.70	22.40
17:07:37	87.30	11.50	86.10	34.30	9.60	13.10	14.60	13.80	21.90	19.40	31.00	29.70	35.10	22.20
17:08:07	87.60	11.20	86.40	34.30	9.70	12.30	14.60	13.80	22.00	19.40	30.80	29.40	39.80	22.40
17:08:37	87.80	11.90	86.60	34.00	9.80	13.90	14.70	14.00	22.20	19.50	31.50	28.90	37.60	22.20
17:09:07	88.20	13.20	86.90	33.90	9.60	12.10	14.70	14.10	21.70	19.60	30.80	29.60	43.30	21.90
17:09:37	88.30	7.10	87.10	34.30	9.50	10.80	14.40	14.10	21.20	19.30	30.70	29.30	41.80	20.80
17:10:07	88.20	6.50	86.80	34.30	9.20	10.50	13.90	13.90	21.10	19.10	30.40	29.40	38.90	21.00
17:10:37	87.90	6.20	86.50	34.30	8.90	9.80	13.60	13.60	20.80	18.70	30.80	30.40	41.40	20.80

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
17:11:37	87.10	6.40	85.90	34.80	9.00	9.3	13.70	13.20	21.20	18.50	31.00	29.40	37.40	21.50
17:12:07	86.90	7.30	85.60	34.50	9.10	9.90	13.90	13.10	21.50	18.60	30.80	30.60	39.00	21.20
17:13:07	86.80	7.10	85.50	34.80	9.30	10.20	14.00	13.20	21.60	18.80	31.40	30.30	37.10	21.50
17:13:37	86.60	8.00	85.3	34.70	9.30	11.00	14.10	13.30	21.70	18.80	30.60	29.30	39.10	22.00
17:14:07	86.90	11.50	85.50	34.30	9.40	13.30	14.30	13.40	21.80	19.10	29.90	30.00	35.60	22.10
17:14:37	87.30	11.00	85.90	34.40	9.80	11.20	14.40	13.60	21.90	19.30	30.90	29.40	38.90	22.20
17:16:37	87.80	10.80	86.50	34.30	9.70	13.00	14.60	14.00	22.00	19.70	30.50	30.30	35.40	21.90
17:17:07	88.00	9.80	86.70	33.90	9.50	11.10	14.30	14.00	21.70	19.50	31.70	30.80	35.10	21.40
17:17:37	87.90	6.60	86.50	34.30	9.40	11.20	14.30	13.80	21.50	19.30	31.50	30.40	40.70	21.10
17:18:07	87.60	6.70	86.20	34.30	9.10	10.20	13.90	13.60	21.40	19.00	31.20	30.30	38.20	21.10
17:18:37	87.30	6.50	86.00	34.20	9.00	10.1	13.90	13.40	21.40	19.00	31.20	30.30	38.20	21.10
17:19:07	87.00	6.40	85.70	34.10	8.90	9.90	13.80	13.30	21.50	18.80	31.00	30.00	36.20	21.40
17:19:37	86.90	6.40	85.60	34.10	9.00	10.5	13.70	13.30	21.30	18.60	30.70	29.90	41.30	20.80
17:20:07	86.60	6.60	85.30	33.90	8.90	10.30	13.70	13.20	21.30	18.60	31.10	29.50	38.10	21.20
17:20:37	86.60	8.20	85.10	33.60	9.30	11.50	14.20	13.30	21.40	18.90	31.40	29.10	39.40	21.70
17:21:07	86.70	9.30	85.30	33.60	9.50	11.10	14.50	13.50	21.70	19.20	30.80	29.50	39.30	21.70
17:21:37	86.90	10.10	85.60	33.70	9.70	11.80	14.80	13.80	21.80	19.40	31.50	29.20	39.00	22.00
17:22:07	87.00	9.30	85.50	33.80	9.70	12.20	14.70	13.90	21.90	19.60	30.90	29.60	38.00	22.00
17:22:37	87.20	11.10	85.90	33.60	9.70	12.60	14.80	14.10	22.00	19.70	31.10	29.80	35.50	21.90
17:23:07	87.40	10.40	86.10	33.80	9.90	12.30	14.80	14.20	22.00	19.80	30.70	29.80	37.00	21.90
17:23:37	87.50	10.50	86.20	33.70	9.70	12.50	15.00	14.20	22.00	19.90	30.70	28.10	34.10	22.40

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{ambient}$	$T_{air,Cond,i}$	$T_{air,Cond,o}$	T_{room}
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
17:24:07	87.90	12.10	86.50	33.60	9.80	13.10	14.90	14.20	22.00	19.90	30.90	29.40	37.10	22.10
17:24:37	88.10	11.20	86.60	33.40	9.80	12.00	15.10	14.30	22.50	20.00	31.30	28.90	36.70	22.10
17:25:07	88.10	7.90	86.80	33.70	9.90	12.60	14.70	14.30	22.20	19.90	31.10	29.30	37.10	22.10
17:25:37	87.90	9.60	86.50	33.50	9.90	12.80	15.00	14.40	22.00	20.00	30.40	29.50	40.40	22.30
17:26:07	88.20	11.90	86.70	33.40	10.00	13.90	15.30	14.50	22.10	20.00	29.40	29.00	40.80	22.10
17:26:37	88.30	12.40	86.80	33.40	10.10	14.80	15.30	14.60	22.20	20.20	29.70	28.80	33.60	22.20
17:27:07	88.50	12.40	87.10	33.10	10.10	12.90	15.20	14.60	22.10	20.20	29.50	28.70	34.40	21.90
17:27:37	88.60	11.80	87.20	33.10	9.90	13.30	15.10	14.70	22.10	20.10	29.50	29.00	39.40	22.10
17:28:07	88.80	11.00	87.20	33.30	10.10	13.80	15.20	14.70	22.20	20.10	29.60	28.80	35.80	22.20
17:28:37	88.80	12.70	87.40	33.00	10.00	15.70	15.40	14.80	21.90	20.10	29.60	28.90	38.70	21.90
17:29:07	89.10	11.90	87.40	33.10	10.00	12.70	15.20	14.80	22.40	20.00	29.20	28.90	36.70	22.00

Appendix B. Testing data of the modified air-conditioner

Table B.1 Testing data of the modified air-conditioner at thickness 40 cm.

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{air,ambient}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
6:28:56	19.60	19.20	19.30	18.70	18.40	18.20	19.80	19.10	18.50	18.40	17.80
6:33:26	34.40	16.90	33.60	18.90	16.80	16.60	16.10	12.80	17.30	15.50	18.10
6:38:26	32.70	18.20	29.00	18.00	16.40	17.80	16.40	14.40	17.50	16.00	18.30
6:43:26	35.60	6.50	35.40	21.20	-2.70	13.6	11.80	14.70	16.50	16.70	18.50
6:48:26	35.00	15.40	32.40	19.20	11.00	15.50	13.80	12.20	15.80	15.90	18.30
6:53:26	33.10	17.50	30.70	18.10	17.30	18.1	16.30	14.20	17.30	16.20	18.80
6:58:26	35.60	6.10	33.60	22.90	12.00	8.70	14.00	15.70	17.30	16.70	19.30
7:03:26	36.40	13.90	35.10	20.40	10.10	14.5	13.10	12.70	15.70	16.40	19.10
7:08:26	32.60	18.00	30.00	18.40	17.60	18.50	16.40	14.30	17.20	16.30	19.70
7:13:26	31.40	9.90	30.30	20.40	16.60	13.20	16.60	15.90	17.70	16.90	19.40
7:18:26	38.40	13.50	37.80	20.20	5.50	13.90	11.80	13.10	15.20	16.40	19.60
7:23:26	33.30	18.80	30.20	19.00	17.80	19.00	16.50	14.10	17.00	16.20	20.60
7:28:26	32.90	20.20	29.50	19.40	17.40	19.00	17.30	15.90	17.80	16.90	20.90
7:33:26	39.10	11.30	38.60	21.90	0.20	14.3	11.90	14.70	15.90	17.10	22.00
7:38:26	37.90	17.40	35.10	24.40	15.80	17.00	15.00	12.80	16.10	16.40	21.40
7:43:26	35.10	20.30	31.60	18.90	18.20	19.20	17.20	15.00	17.40	16.60	21.80
7:48:26	35.60	21.00	31.90	20.00	17.90	19.20	17.50	16.20	18.00	17.20	21.90
7:53:26	41.2	13.1	40.3	23.4	0.3	14.5	12.1	14.9	15.9	17.2	23

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{air,ambient}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
7:58:26	40.8	17.3	38.4	26.3	14.3	16.2	14.2	12.5	15.9	16.7	22.8
8:03:26	37.6	20	33.9	20.4	18.8	19.5	17	14.2	17.3	16.6	22.7
8:08:26	37.3	22	33	20.2	18.6	19.5	17.7	16	17.8	16.9	22.8
8:13:26	39.4	7.2	39.2	26.5	-2	14.9	14.2	16.2	17	17.5	24.8
8:18:26	44.7	13.9	44.2	23.9	0.2	13	10.1	13.8	15.5	17.3	24.6
8:23:26	42.3	17.7	39.3	27.9	16.4	17.1	15.1	12.5	15.9	16.4	23
8:28:26	39.7	21	35.8	21.1	19.5	20.1	17.5	14.5	17.3	16.4	23.4
8:33:26	39.1	22.4	34.6	20.4	19	19.8	17.9	16	17.8	16.9	23.8
8:38:26	39.7	6.8	39.5	26.6	-1.7	14.3	14.8	16.3	17	17.4	23.2
8:43:26	45.5	13.4	44.8	23.7	0.5	11.8	9.9	13.8	15.3	17.2	23.1
8:48:26	39.4	19.8	36	24.7	18	19	16	12.9	16.4	16.4	23.9
8:53:26	37.9	21.6	34.2	19.5	18.9	19.8	17.7	15	17.5	16.7	24.2
8:58:26	40.6	22.3	36.2	20.5	19.1	19.7	18.2	16.5	17.8	17	24.8
9:03:26	41	8.7	40.7	27.6	-2.2	15.7	14.2	16.3	17	17.5	24.5
9:08:26	46.3	14.2	45.8	24.5	1.5	13.5	10.8	14.2	15.6	17.5	23.9
9:13:26	45.4	16.4	42.7	29.4	14.3	15.2	14.1	12.2	15.5	16.6	24.9
9:18:26	40.7	21.3	36.5	22	19.4	20.1	17.3	14	16.9	16.4	25.5
9:23:26	41.1	22.3	36.6	20.4	19.3	20.2	18	15.7	17.8	16.9	26.5
9:28:26	40.6	23.3	35.9	21.6	18.6	19.6	18.1	16.5	18.1	17.4	24.8
9:33:26	42.7	12.2	41.8	26.8	0.4	15.8	14.1	16.1	16.5	17.5	26.7
9:38:26	48.8	13.7	48	26	2.1	11.2	10.1	14	15.1	17.3	24.3

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{air,ambient}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
9:43:26	47.4	15.7	45.2	30.2	13.2	14.3	13.4	11.8	15.2	16.5	25.7
9:48:26	43.5	20.3	39.1	25.2	19.1	19.5	16.7	13	16.6	16.1	26
9:53:26	42.1	22.7	37.2	20.9	19.7	20.3	17.9	14.8	17.2	16.3	26.7
9:58:26	42.9	22.3	37.9	20.8	19.3	20	18.1	16	17.8	16.8	26
10:01:25	44.9	19	41.2	28.4	18.1	18.5	16.1	12.4	16.1	16.4	27.3
10:06:58	42.8	22.3	38	21.1	19.9	20.2	18.1	15	17.4	16.3	27.1
10:12:28	43.1	24.1	37.9	23.1	19.4	20.4	19.8	17.3	19.9	18.1	26.6
10:17:56	71.6	8.6	70.6	29.5	6.1	10.5	13	12.8	21	20.4	27
10:23:16	76.7	3.4	75.7	30.7	6.2	7.5	12.6	11.8	21.6	20.5	27.5
10:28:24	79	3.7	77.8	31.1	6.8	8	13.5	12.6	21.9	20.9	28.2
10:33:31	79.2	3	77.9	30	6.2	7.6	13.3	12.8	21.9	20.8	28.2
10:38:30	76.9	3.8	75.7	32.2	7	7.9	13.7	12.9	22.1	20.9	27.9
10:43:31	78.3	3.2	77.3	30.1	6.4	7.1	14.1	12.7	22.4	21	27
10:48:32	77.3	4	76.2	32	7.3	8.1	14.1	12.7	22.7	21.1	28.5
10:53:31	78.8	3.5	77.5	30.7	6.6	7.7	14.1	13.1	22.3	21.1	27.3
10:58:10	78.9	4.1	77.9	32.1	7.1	7.7	14.1	13.1	23	21.3	29.2
11:02:40	80.1	4.8	78.7	32.5	7.4	9	14.6	13.4	23	21.6	31.2
11:07:10	82.9	4.5	81.4	31.7	7.2	8.3	14.4	13.7	23.1	21.7	29.3
11:11:40	81.6	4.5	80.4	32.6	7.2	7.8	14.3	13.3	23.6	21.5	29.5
11:16:05	81.2	4.5	79.9	33.9	7.6	8.2	14.6	13.6	23.4	21.6	28.9
11:20:15	82.7	4.3	81.5	32.9	7.4	7.8	14.5	13.4	23.3	21.6	29.5

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{air,ambient}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
11:24:19	81.3	4.1	80.3	32.2	7.3	7.9	14.6	13.3	23.5	21.6	29.3
11:28:20	81.3	5.8	80	32	7.1	7.2	14.3	13.3	23.4	21.6	29.2
11:32:19	82.3	8.6	81.1	32.1	7.4	8.2	14.3	13.5	23.7	22	29.1
11:36:19	81.6	4.7	80.4	32.9	7.6	7.8	15.2	13.6	23.7	21.8	28.8
11:40:06	82	4.8	80.7	33.7	7.6	8.1	15.6	13.6	23.9	22	30.5
11:43:44	82.1	4.2	80.8	32.6	7.3	7.8	14.3	13.4	23.4	21.7	29.9
11:47:18	82.2	4.5	80.8	31.3	7.1	7.7	15.1	13.8	23.6	21.8	27.5
11:50:48	80.5	4.6	79.2	33.2	7.5	8.1	14.9	13.6	23.5	21.7	30
11:54:18	80.8	4.8	79.6	32.9	7.6	8.3	14.8	13.9	24	21.9	27.7
11:57:48	81.5	8.4	80.1	32.6	7.4	10.8	14.9	13.8	24.4	22.1	30.5
12:01:18	83.2	4.9	82.2	32.2	7.6	8.5	15.6	13.9	24.5	22.4	29.6
12:04:26	82.9	4.4	81.9	33.3	7.4	7.4	14.5	13.6	24	22.2	30.4
12:07:32	82.7	4.5	81.6	33.5	7.7	8	14.9	13.6	24.1	22.1	30.2
12:10:32	81.5	4.1	80.4	32	7.2	8	14.6	13.6	23.9	22.1	29.9
12:13:32	81.5	6.4	80.5	32.2	7.3	7.9	14.9	13.7	24.3	22.2	29.8
12:16:32	81.5	4.4	80.4	33.8	7.7	7.5	14.8	13.6	24.3	22.2	31.4
12:19:32	81.8	4.5	80.9	33.3	7.4	7.6	14.7	13.5	24.3	22.2	31.1
12:22:32	81	4.2	80.1	33.2	7.4	8	14.4	13.4	24.2	21.9	30.5
12:25:29	81	4.5	79.9	33.3	7.5	7.9	14.7	13.5	24.1	22.1	31.7
12:28:10	81.1	4.6	80.1	33.2	7.4	7	14.7	13.8	24.2	22.1	29.6
12:30:40	81.2	5.1	80.2	33.2	7.6	7.3	14.9	13.8	24.3	22.1	29.2

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{air,ambient}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
12:33:10	81.2	4.7	80.3	34	7.5	6.7	14.8	13.8	24.3	22.3	31.4
12:35:40	81.9	4.6	80.9	34.1	7.8	7.4	15.4	13.7	24.5	22.4	32.5
12:38:10	81.5	4.9	80.6	33.9	7.9	6.8	15.2	13.8	24.7	22.4	32.5
12:40:40	82.3	5	81.2	33.6	7.7	7.9	15.2	13.8	25.2	22.6	29.9
12:43:10	82	4.6	80.9	33.6	7.7	7.2	15.2	14	24.7	22.5	31.4
12:45:39	81.1	5.1	80.1	34.4	8.1	8.1	15.3	13.9	24.9	22.5	32.5
12:48:08	82.3	5.1	81	33.8	7.9	7.8	15.4	14.3	24.8	22.7	33.5
12:52:02	83.1	5.6	81.7	33.4	7.8	8.1	15.9	14.4	25.2	22.7	31.1
12:58:20	81.7	5.1	80.6	34.7	8.1	6.9	15.3	14.2	25.3	22.7	31.1
13:04:25	83.2	5.1	81.9	34.2	8.1	8.4	15.5	14.4	25.4	22.9	32.5
13:10:29	84	5	82.7	34.1	8.1	7.3	15.9	14.5	25.7	23	30.2
13:16:22	80.8	4.3	79.7	33.1	7.4	6.9	15.3	13.7	25.1	22.4	29.9
13:22:04	80.8	4.8	80.1	34.1	8	7.8	14.8	13.8	25.2	22.7	33.2
13:28:24	81.1	4.2	80	32.5	7.4	7.7	14.6	13.7	24.8	22.5	29.4
13:36:13	82	4.9	80.8	34.9	8	6.8	15.6	13.9	25.3	22.9	32
13:45:45	80.8	4.7	79.9	34.6	7.9	6.7	15	13.8	25.2	22.8	31
13:55:15	80.8	4.6	79.8	33.6	7.7	7.1	15.2	13.6	25	22.5	30.1
14:32:39	83.5	5.1	82.2	34.7	8.1	6.8	15.3	14.6	25.8	23.5	31.9
14:37:09	82	4.6	80.6	34.4	7.8	6.9	15.3	14.1	26	23	31.6
14:42:09	82.3	5	81	35.3	8.3	7	15.2	14.4	25.7	23.3	32.3
14:47:09	81.8	4.7	80.3	34.5	7.9	6.6	15.5	14.2	25.4	22.9	32.3

Time	$T_{ref,Comp,o}$	$T_{ref,Comp,i}$	$T_{ref,Cond,i}$	$T_{ref,Cond,o}$	$T_{ref,Evap,i}$	$T_{ref,Evap,o}$	$T_{air,db,Evap,o}$	$T_{air,wb,Evap,o}$	$T_{air,db,Evap,i}$	$T_{air,wb,Evap,i}$	$T_{air,ambient}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
14:52:09	83	5.6	81.9	36.4	8.8	7.5	16.4	14.5	26.2	23.6	34.2
14:57:39	82.1	5	80.9	35.4	8.2	6.8	15.6	14.3	26.1	23.4	33.3
15:02:22	82.4	4.9	81.1	35.3	8.2	7.1	15.8	14.3	25.9	23.4	35.1
15:07:01	83.1	5.1	81.9	34.5	8	7	15.5	14.2	26.2	23.6	31
15:12:09	82.1	4.7	81.1	34.9	7.9	6.5	15.5	14.1	26.4	23.6	32.4
15:14:58	81.7	4.5	80.4	34.1	7.8	6.3	15.3	14	26	23.3	31.1

Table B.2 Testing data of the modified air-conditioner at thickness 40 cm (Continued).

Time	$T_{air,Cond,i}$	$T_{air,Cond,o}$	$T_{air,room}$	$T_{air,bed,o}$	$T_{RT20,bed1}$	$T_{RT20,bed2}$	$T_{RT20,bed3}$	$T_{RT20,bed4}$	$T_{RT20,bed5}$	$T_{RT20,bed6}$	$T_{air,bed,i}$	$T_{air,wb,bed,i}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
6:28:56	19.00	18.40	20.30	18.50	21.70	21.40	21.30	21.40	21.50	21.30	20.60	19.40
6:33:26	19.60	23.50	21.80	17.30	20.10	21.40	21.40	21.20	21.50	20.10	16.00	14.60
6:38:26	19.00	23.80	22.10	17.50	20.10	21.40	21.30	20.60	21.60	19.90	16.50	16.00
6:43:26	18.80	28.90	22.10	16.00	19.90	21.30	21.20	20.00	21.40	19.80	13.70	15.70
6:48:26	19.30	25.10	21.90	15.60	19.50	20.90	20.90	19.40	21.10	19.20	14.00	12.50
6:53:26	19.90	25.50	22.20	17.00	19.90	20.70	20.70	19.00	21.00	19.30	16.30	15.60
6:58:26	19.60	28.00	22.20	17.00	19.70	20.50	20.50	18.60	20.70	19.30	16.20	16.80
7:03:26	19.90	24.40	22.30	15.40	18.90	20.20	20.20	18.20	20.20	18.50	13.50	12.80
7:08:26	20.60	23.50	22.50	16.90	19.20	20.00	20.00	18.00	20.10	18.80	16.50	15.60
7:13:26	20.30	25.00	22.60	17.50	19.10	19.70	19.70	17.70	19.80	18.80	17.20	16.90
7:18:26	20.10	27.60	22.40	14.80	18.10	19.60	19.50	17.40	19.70	18.40	12.80	13.20
7:23:26	21.80	24.60	22.80	16.70	18.50	19.40	19.30	17.30	19.50	18.30	16.40	15.20
7:28:26	22.00	25.90	23.00	17.60	18.50	19.20	19.10	17.20	19.30	18.40	17.40	16.90
7:33:26	22.00	30.90	23.10	15.60	17.50	18.90	18.80	16.90	18.90	18.00	13.70	15.00
7:38:26	21.20	30.30	23.20	15.90	17.50	18.90	18.80	16.80	18.90	17.80	15.10	13.10
7:43:26	22.60	28.60	23.40	17.20	17.90	18.80	18.70	16.80	18.80	18.00	17.30	16.30
7:48:26	22.60	26.50	23.60	17.70	17.80	18.50	18.40	16.70	18.40	18.00	17.80	17.30
7:53:26	23.6	32.5	23.5	15.6	17.1	18.5	18.4	16.7	18.4	17.8	14.1	15.4
7:58:26	23.7	33.3	23.8	15.7	16.8	18.3	18.2	16.4	20.8	17.4	14.5	12.5
8:03:26	24.4	26.8	23.9	16.9	17.1	18	17.9	16.2	22.4	17.4	17	15.4

Time	$T_{air,Cond,i}$	$T_{air,Cond,o}$	$T_{air,room}$	$T_{air,bed,o}$	$T_{RT20,bed1}$	$T_{RT20,bed2}$	$T_{RT20,bed3}$	$T_{RT20,bed4}$	$T_{RT20,bed5}$	$T_{RT20,bed6}$	$T_{air,bed,i}$	$T_{air,wb,bed,i}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
8:08:26	21.8	27.9	23.8	17.4	17.3	18	17.9	16.3	17.9	17.6	17.8	17.1
8:13:26	24.8	34.7	24.3	16.5	16.8	17.9	17.8	16.4	17.8	17.6	15.8	17
8:18:26	25	33.9	24.4	15.4	16	17.7	17.6	16.1	21.7	17.2	13.2	14.3
8:23:26	23.5	30.9	24.3	15.7	15.9	17.3	17.3	15.8	24.2	16.7	15.1	12.4
8:28:26	22.5	33.4	24.5	17	16.8	17.5	17.4	16	19.6	17.1	17.4	15.8
8:33:26	24.1	29.5	24.8	17.5	16.9	17.3	17.3	16	17	17.3	17.9	17.2
8:38:26	23.5	35	24.9	16.5	16.1	17	17	15.9	16.8	17.2	15.8	17
8:43:26	23.8	34.2	24.8	15.5	15.2	17	17.1	15.9	16.7	16.8	13	14.1
8:48:26	22.9	34.3	25.1	16.2	15.9	17	17	15.7	16.6	16.6	16.2	13.5
8:53:26	22.7	29.4	25.1	17.3	16.4	16.8	16.8	15.7	16.5	16.7	17.5	16.4
8:58:26	25.3	31.5	25.2	17.6	16.7	16.7	16.8	15.8	16.7	17	18.1	17.4
9:03:26	24.7	36.1	25.4	16.6	16	16.7	16.8	16	16.7	17.1	15.8	17.2
9:08:26	24.8	35.2	25.7	15.4	15.1	16.6	16.7	15.8	16.4	16.6	13.6	14.8
9:13:26	28.8	28	25.4	15.3	14.9	16.3	16.4	15.4	16.1	16	14.5	11.9
9:18:26	26.2	30.6	25.6	16.8	16.2	16.5	16.6	15.6	16.3	16.4	17.3	15.2
9:23:26	26.5	31.9	25.9	17.6	16.7	16.5	16.6	15.8	16.5	16.8	18.1	17.1
9:28:26	24.5	36.5	26	17.9	16.8	16.3	16.4	15.8	16.5	16.9	18.4	17.7
9:33:26	26	35.7	26	16.1	15.6	16.3	16.4	15.9	16.5	16.7	15.6	16.4
9:38:26	26.6	36.5	26.2	15.4	14.6	16.3	16.5	15.8	16.3	16.2	13.4	14.4
9:43:26	30.7	27.1	26.1	15.1	14.6	16.1	16.4	15.5	16	15.9	14.1	11.7
9:48:26	26.2	32.3	26.2	16.4	15.6	15.9	16.2	15.3	15.8	15.8	16.6	13.9

Time	$T_{air,Cond,i}$	$T_{air,Cond,o}$	$T_{air,room}$	$T_{air,bed,o}$	$T_{RT20,bed1}$	$T_{RT20,bed2}$	$T_{RT20,bed3}$	$T_{RT20,bed4}$	$T_{RT20,bed5}$	$T_{RT20,bed6}$	$T_{air,bed,i}$	$T_{air,wb,bed,i}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
9:53:26	26.1	30.2	26.2	17.1	16.4	16	16.3	15.5	16.1	16.3	17.9	16.3
9:58:26	27.3	29.8	26.5	17.6	16.6	16	16.2	15.7	16.2	16.5	18.2	17.3
10:01:25	30.1	32.2	26.4	16	15.3	16	16.2	15.4	15.9	15.8	16.2	13
10:06:58	27.3	29.4	28	17.2	16.2	15.7	16	15.3	15.9	16.1	17.8	16.2
10:12:28	26	34.8	26	19.8	18	16	16.2	15.9	16.4	16.9	26	18.7
10:17:56	27.7	42.4	22.9	21.1	18.2	16.5	16.6	17.3	17.4	18.1	22.6	19.2
10:23:16	28.5	43.6	23.2	21.3	18.7	17	17.1	18.2	18.1	18.8	22.9	19.3
10:28:24	28.3	44.7	23.3	21.5	19	17.2	17.2	18.6	18.5	19	22.8	19.8
10:33:31	28.9	43.6	22.8	21.6	19.2	17.7	17.7	19.2	18.9	19.5	22	19.6
10:38:30	30.4	45.4	22.9	21.9	19.6	18	18	19.5	19.2	19.6	23	19.8
10:43:31	28.2	44	22.6	21.8	19.5	18.2	18.3	19.8	19.4	19.8	22.3	19.7
10:48:32	29.6	45.6	23.4	22.2	19.4	18.4	18.5	20	19.6	20	22.7	20.1
10:53:31	28.7	44.1	22.2	22	19.3	18.6	18.7	20.1	19	20.1	22.3	20
10:58:10	28.8	44.4	24	22.3	19.4	18.6	18.8	20.2	19.1	20.1	23.4	20.5
11:02:40	29.8	45.5	23.8	22.3	19.7	18.8	18.9	20.3	19.1	20.2	23.5	20.5
11:07:10	29.3	45.2	23.8	22.9	20.1	19.2	19.3	20.8	19.5	20.7	22.9	21
11:11:40	28.7	44.8	23.9	23.1	20.1	19.2	19.3	20.8	19.5	20.6	23.9	20.9
11:16:05	31	46.4	24.3	22.9	20.3	19.4	19.5	21	19.7	20.8	23.4	21
11:20:15	29.2	45.6	24.2	22.9	20.4	19.5	19.6	21.1	19.8	20.9	23.2	20.6
11:24:19	29.3	46.2	23.3	22.9	20.5	19.7	19.8	21.3	20	21	23.1	20.6
11:28:20	29.9	45.7	22.9	22.9	20.6	19.9	19.9	21.4	20.1	21	22.9	20.6

Time	$T_{air,Cond,i}$	$T_{air,Cond,o}$	$T_{air,room}$	$T_{air,bed,o}$	$T_{RT20,bed1}$	$T_{RT20,bed2}$	$T_{RT20,bed3}$	$T_{RT20,bed4}$	$T_{RT20,bed5}$	$T_{RT20,bed6}$	$T_{air,bed,i}$	$T_{air,wb,bed,i}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
11:32:19	29.1	45.3	23.9	23.3	20.8	19.9	20	21.5	20.2	21.2	23.7	21.7
11:36:19	30.6	45.9	24.3	23.4	20.9	19.9	20.1	21.5	20.3	21.2	23.6	21.2
11:40:06	30.4	45.9	24.2	23.6	20.9	20	20.1	21.7	20.3	21.3	23.7	21.8
11:43:44	30.6	45.9	23.5	23.4	20.9	20	20.2	21.8	20.4	21.3	23.3	21.1
11:47:18	28.5	44.4	23.5	23	21	20.2	20.3	21.8	20.5	21.4	23	21.3
11:50:48	29.8	45.4	24.2	23	21.1	20.3	20.4	21.8	20.6	21.4	23.4	21.3
11:54:18	29.1	45.6	23.6	23.6	21.4	20.5	20.7	22	20.7	21.7	23.8	22
11:57:48	29.6	45	24.3	24	21.6	20.6	20.8	22.3	20.9	21.8	25	22.5
12:01:18	29.9	44.8	24.9	24.3	21.7	20.7	20.9	22.6	21	22.1	24.6	22.9
12:04:26	29.7	45.1	24.9	23.7	21.6	20.8	20.9	22.3	21.1	22	23.7	22
12:07:32	30.7	45.9	24.6	23.7	21.7	20.9	21	22.4	21.3	22.1	23.7	22.1
12:10:32	30	45.4	23.7	23.6	21.7	20.9	21	22.4	21.3	22.1	23.6	21.9
12:13:32	29.8	45.8	24.3	23.6	21.9	21	21.1	22.6	21.4	22.2	23.8	22.4
12:16:32	33.7	47.2	24.3	23.5	21.9	21	21.2	22.6	21.4	22.2	23.5	22.1
12:19:32	31.5	46.1	24.3	23.9	21.9	21.1	21.2	22.7	21.5	22.2	24	22.2
12:22:32	30.5	45.2	24.6	23.7	22.1	21.2	21.3	22.9	21.6	22.2	23.8	21.8
12:25:29	31.4	45.6	23.4	23.6	22.2	21.3	21.4	23.1	21.7	22.3	23.7	22.2
12:28:10	30.4	46.2	24	23.6	22.5	21.3	21.4	23.1	21.7	22.3	23.5	22.2
12:30:40	30.2	45.7	24.4	23.7	22.7	21.3	21.5	23.3	21.7	22.4	23.9	22.3
12:33:10	31.7	46.8	23.8	23.9	23	21.4	21.5	23.5	21.7	22.4	23.5	22.2
12:35:40	32.9	46.8	24.3	24.1	23.1	21.4	21.5	23.7	21.8	22.5	23.9	22.4

Time	$T_{air,Cond,i}$	$T_{air,Cond,o}$	$T_{air,room}$	$T_{air,bed,o}$	$T_{RT20,bed1}$	$T_{RT20,bed2}$	$T_{RT20,bed3}$	$T_{RT20,bed4}$	$T_{RT20,bed5}$	$T_{RT20,bed6}$	$T_{air,bed,i}$	$T_{air,wb,bed,i}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
12:38:10	31.8	46.6	25.5	24.4	23.4	21.5	21.7	23.9	22	22.6	25.4	22.8
12:40:40	32	46.6	24.6	24.1	23.5	21.5	21.7	24.1	22	22.7	24.5	23.1
12:43:10	32.1	47.1	25.3	24.2	23.4	21.6	21.7	24.1	22.2	22.7	23.6	22.3
12:45:39	31.9	46.5	25.1	24.4	23.6	21.6	21.7	24.1	22.3	22.8	24.5	22.8
12:48:08	33.5	47.4	25.4	24.4	23.7	21.6	21.7	24.2	22.3	22.9	23.8	23
12:52:02	30.9	46	25.3	24.7	24.3	21.7	21.9	24.6	22.7	23.1	24.5	23.3
12:58:20	31.6	46.7	25.7	25	24.6	22	22.2	24.6	23.2	23.4	25.1	23.2
13:04:25	31.6	46.5	26.1	24.9	24.9	22.8	22.7	25	23.8	23.8	24.9	23.2
13:10:29	32.4	46.9	24.7	25.3	25	23.2	23.7	25.1	24.3	24.2	24.5	23.1
13:16:22	30.5	45.9	23.8	24.5	24.6	23.8	24.4	24.4	24.7	24.3	23.7	22.3
13:22:04	32.8	47.1	24.3	24.6	24.4	24.2	24.5	24.2	24.7	24.5	24	22.7
13:28:24	30	45	23.9	24.2	24.2	24.3	24.5	24	24.6	24.5	23.7	22.2
13:36:13	32.4	47.3	25.5	24.9	24.3	24.2	24.4	24.2	24.5	24.6	24.6	22.9
13:45:45	33.1	47.3	25.8	24.9	24.3	24.3	24.5	24.1	24.5	24.6	24.7	22.7
13:55:15	30.6	45.9	24.2	24.4	24.2	24.4	24.5	24	24.6	24.6	24	22.4
14:32:39	32	47.1	25.6	25.3	24.8	24.6	24.7	24.7	24.9	25	25.2	23.5
14:37:09	31.6	46.8	25.6	25.3	24.8	24.7	24.9	24.8	25	25.1	24.7	22.9
14:42:09	32.2	47.5	25.5	25.4	24.8	24.8	24.9	24.8	25	25.1	24.8	23.2
14:47:09	32.9	47.1	25.4	25	24.6	24.7	24.9	24.4	25	24.9	24.2	22.6
14:52:09	32.6	49	25.6	25.4	24.8	24.9	25	24.7	25	25.1	25	23.5
14:57:39	33	48	25.6	25.3	25	25.1	25.2	24.9	25.3	25.3	24.5	23.2

Time	$T_{air,Cond,i}$	$T_{air,Cond,o}$	$T_{air,room}$	$T_{air,bed,o}$	$T_{RT20,bed1}$	$T_{RT20,bed2}$	$T_{RT20,bed3}$	$T_{RT20,bed4}$	$T_{RT20,bed5}$	$T_{RT20,bed6}$	$T_{air,bed,i}$	$T_{air,wb,bed,i}$
	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)	(°C)
15:02:22	31.7	47.5	25.6	25.5	25	25.1	25.2	24.9	25.3	25.3	25.1	23.2
15:07:01	31.8	47.4	28.8	25.7	25	25	25.2	25	25.3	25.3	24.5	23.3
15:12:09	31.8	47.6	32	25.9	25.1	25.1	25.3	25.1	25.3	25.5	25.3	23.5
15:14:58	31.5	46.6	26	25.5	25	25.1	25.4	25.1	25.4	25.5	24.4	23

Other measured data as shown in Table B.1-B.2 save in the CD-ROM.

Appendix C. Calculation results of the modified air-conditioner

Table C.1 Calculation results of the normal air-conditioner.

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
15:31:07	7.00	22.65	79.19	94.18	79.77	61.83	0.83	0.587	0.011	0.015
15:31:37	6.50	22.65	79.19	97.04	79.77	61.54	0.83	0.588	0.011	0.015
15:32:07	6.90	22.80	77.15	92.30	79.77	61.54	0.83	0.587	0.011	0.015
15:32:37	6.40	22.50	79.83	94.17	79.41	61.54	0.83	0.587	0.011	0.015
15:33:07	6.80	22.70	77.10	94.17	79.41	61.54	0.83	0.587	0.011	0.015
15:33:37	6.50	22.50	77.00	93.17	78.70	60.69	0.83	0.588	0.011	0.014
15:34:07	6.80	22.50	77.00	93.15	78.70	60.41	0.83	0.588	0.010	0.014
15:34:37	7.20	22.60	75.66	93.13	78.70	60.13	0.83	0.589	0.010	0.014
15:35:07	7.10	22.40	78.36	93.13	78.70	60.13	0.83	0.589	0.010	0.015
15:35:37	7.70	22.35	77.63	92.19	78.35	60.13	0.83	0.588	0.010	0.014
15:36:07	7.00	22.55	74.95	93.13	78.35	60.13	0.83	0.589	0.010	0.014
15:36:37	6.80	22.30	79.74	92.21	78.70	60.41	0.83	0.588	0.010	0.015
15:37:07	7.10	22.40	78.36	94.12	78.70	60.69	0.83	0.588	0.011	0.015
15:37:37	6.80	22.35	77.63	93.15	78.35	60.41	0.83	0.588	0.010	0.014
15:38:07	7.60	22.25	79.00	93.15	78.35	60.41	0.83	0.588	0.010	0.014
15:38:37	8.50	22.20	79.70	93.13	78.35	60.13	0.83	0.589	0.010	0.014
15:39:07	8.20	22.05	80.35	93.11	78.00	59.85	0.83	0.589	0.010	0.014
15:39:37	6.70	22.40	75.56	93.11	78.00	59.85	0.83	0.589	0.010	0.014

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
15:40:07	7.50	22.05	80.35	92.16	78.00	59.85	0.83	0.589	0.010	0.014
15:40:37	8.20	21.85	80.26	93.11	77.30	59.85	0.83	0.589	0.010	0.014
15:41:07	8.10	22.00	81.06	94.07	78.00	59.85	0.83	0.589	0.010	0.014
15:41:37	7.00	22.05	78.91	92.14	77.65	59.57	0.83	0.589	0.010	0.014
15:42:07	6.80	22.15	78.95	93.11	78.00	59.85	0.83	0.589	0.010	0.014
15:42:37	7.30	21.95	80.31	93.11	77.65	59.85	0.83	0.589	0.010	0.014
15:43:07	7.40	21.95	80.31	93.11	77.65	59.85	0.83	0.589	0.010	0.014
15:43:37	7.00	22.00	78.17	91.18	77.30	59.30	0.83	0.589	0.010	0.014
15:44:07	7.40	22.10	78.21	92.19	77.65	60.13	0.83	0.588	0.010	0.014
15:44:37	7.40	21.90	81.02	94.09	77.65	60.13	0.83	0.589	0.010	0.014
15:45:07	7.90	21.80	80.98	95.99	77.30	59.29	0.83	0.590	0.010	0.014
15:45:37	8.30	21.60	82.38	94.04	76.95	59.29	0.83	0.590	0.010	0.014
15:46:07	7.40	21.90	79.56	90.27	77.30	59.57	0.83	0.589	0.010	0.014
15:46:37	8.00	21.90	79.56	90.24	77.30	59.30	0.83	0.589	0.010	0.014
15:47:07	7.80	21.75	81.69	92.14	77.30	59.57	0.83	0.589	0.010	0.014
15:47:37	7.90	21.70	80.93	94.05	76.95	59.57	0.83	0.589	0.010	0.014
15:48:07	7.70	21.70	79.47	94.99	76.61	59.02	0.83	0.590	0.010	0.014
15:48:37	7.70	21.60	79.42	92.07	76.26	58.74	0.83	0.590	0.010	0.014
15:49:07	8.30	21.45	80.08	94.04	75.92	59.29	0.83	0.590	0.010	0.014
15:49:37	7.90	21.35	80.04	95.99	75.58	59.29	0.83	0.590	0.010	0.014
15:50:07	7.40	21.25	79.99	94.98	75.24	58.74	0.83	0.590	0.010	0.014

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
15:50:37	8.60	21.15	79.95	95.95	74.90	58.47	0.83	0.591	0.010	0.014
15:51:07	8.40	21.10	79.18	93.97	74.56	58.20	0.83	0.591	0.010	0.013
15:52:07	8.10	21.25	79.99	93.97	75.24	58.20	0.83	0.591	0.010	0.014
15:52:37	7.80	21.35	81.53	91.10	75.92	58.47	0.83	0.590	0.010	0.014
15:53:07	7.50	21.35	83.03	91.07	76.26	58.20	0.83	0.590	0.010	0.014
15:53:37	6.80	21.50	80.85	93.98	76.26	58.47	0.83	0.590	0.010	0.014
15:54:07	7.20	21.70	78.02	91.07	76.26	58.20	0.83	0.590	0.010	0.014
15:54:37	8.00	21.45	83.07	94.96	76.61	58.47	0.83	0.590	0.010	0.014
15:55:07	7.60	21.45	81.57	93.01	76.26	58.47	0.83	0.590	0.010	0.014
15:55:37	8.00	21.40	82.30	93.01	76.26	58.47	0.83	0.590	0.010	0.014
15:56:07	8.00	21.55	81.61	93.01	76.61	58.47	0.83	0.590	0.010	0.014
15:56:37	7.60	21.65	80.17	93.01	76.61	58.47	0.83	0.590	0.010	0.014
15:57:07	8.10	21.45	83.07	93.01	76.61	58.47	0.83	0.590	0.010	0.014
15:57:37	7.60	21.55	81.61	94.00	76.61	58.74	0.83	0.590	0.010	0.014
15:58:07	7.40	21.40	83.81	93.98	76.61	58.47	0.83	0.590	0.010	0.014
15:58:37	8.00	21.50	83.85	94.96	76.95	58.47	0.83	0.590	0.010	0.014
15:59:07	8.00	21.50	83.85	93.01	76.95	58.47	0.83	0.590	0.010	0.014
16:00:07	8.80	20.90	85.17	98.97	75.24	57.92	0.83	0.592	0.010	0.014
16:00:37	8.10	20.55	82.71	100.00	73.56	56.84	0.83	0.593	0.010	0.013
16:01:07	9.50	20.00	84.85	101.07	72.24	55.78	0.82	0.594	0.010	0.013
16:01:37	8.90	20.05	77.91	96.83	70.94	55.00	0.82	0.594	0.009	0.012

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
16:02:37	7.70	20.40	74.42	89.80	71.27	55.26	0.83	0.593	0.009	0.012
16:03:07	8.40	20.75	76.80	87.99	72.90	56.05	0.83	0.592	0.009	0.013
16:03:37	7.50	21.15	78.47	88.09	74.56	56.85	0.83	0.591	0.009	0.013
16:04:07	7.50	21.15	78.47	88.23	74.56	57.93	0.83	0.590	0.010	0.013
16:04:37	7.20	21.45	81.57	93.03	76.26	58.74	0.83	0.590	0.010	0.014
16:05:07	7.70	21.50	80.85	93.03	76.26	58.74	0.83	0.590	0.010	0.014
16:05:37	8.00	21.40	83.81	93.03	76.61	58.74	0.83	0.590	0.010	0.014
16:06:07	7.40	21.30	83.77	90.21	76.26	59.02	0.83	0.589	0.010	0.014
16:06:37	6.80	21.50	80.85	95.01	76.26	59.29	0.83	0.590	0.010	0.014
16:07:07	7.80	21.40	82.30	92.10	76.26	59.02	0.83	0.589	0.010	0.014
16:07:37	7.60	21.25	84.52	95.01	76.26	59.29	0.83	0.590	0.010	0.014
16:08:07	8.20	21.05	86.00	94.02	75.92	59.02	0.83	0.590	0.010	0.014
16:08:37	8.40	20.70	88.27	94.98	75.24	58.74	0.83	0.590	0.010	0.014
16:09:07	9.10	20.00	89.71	102.09	73.23	57.92	0.83	0.592	0.010	0.014
16:09:37	10.60	19.25	88.68	103.21	70.62	56.31	0.82	0.594	0.010	0.013
16:12:07	9.40	19.10	75.11	91.54	67.48	52.95	0.82	0.596	0.009	0.011
16:12:37	9.50	19.00	79.67	94.67	68.10	53.45	0.82	0.596	0.009	0.012
16:13:07	8.90	19.20	76.68	90.55	68.10	53.20	0.82	0.595	0.009	0.012
16:13:37	10.20	19.10	79.72	93.63	68.41	53.45	0.82	0.595	0.009	0.012
16:14:07	10.30	18.95	83.64	92.63	68.72	53.71	0.82	0.595	0.009	0.012
16:14:37	9.70	19.25	79.02	93.65	68.72	53.71	0.82	0.595	0.009	0.012

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
16:15:07	10.20	19.05	83.68	92.65	69.03	53.97	0.82	0.595	0.009	0.012
16:15:37	10.20	18.75	86.86	96.79	68.72	53.96	0.82	0.595	0.009	0.012
16:16:07	10.60	18.40	85.90	100.00	67.47	53.20	0.82	0.597	0.009	0.012
16:16:37	9.70	18.65	78.70	97.82	66.86	52.69	0.82	0.597	0.009	0.011
16:20:07	9.00	19.90	84.81	93.86	71.91	56.58	0.83	0.592	0.010	0.013
16:20:37	9.70	19.90	88.04	94.87	72.57	56.85	0.83	0.592	0.010	0.013
16:21:07	9.40	19.65	90.46	94.87	72.24	56.85	0.83	0.592	0.010	0.013
16:21:37	9.60	19.80	83.19	95.85	71.26	56.31	0.83	0.593	0.010	0.013
16:22:07	10.60	19.35	87.05	97.90	70.62	56.05	0.83	0.593	0.010	0.013
16:22:37	10.30	19.10	86.15	97.89	69.66	55.52	0.82	0.594	0.009	0.013
16:23:07	10.50	19.05	85.31	96.83	69.35	55.00	0.82	0.594	0.009	0.012
16:23:37	10.10	19.00	81.25	95.77	68.41	54.48	0.82	0.595	0.009	0.012
16:24:07	10.00	19.20	79.77	93.71	68.72	54.48	0.82	0.594	0.009	0.012
16:24:37	9.10	19.70	80.02	86.85	70.30	54.74	0.83	0.593	0.009	0.012
16:25:07	9.40	19.80	81.62	89.84	70.94	55.53	0.83	0.593	0.009	0.013
16:25:37	9.20	20.00	83.27	92.85	71.91	56.31	0.83	0.592	0.009	0.013
16:26:07	9.20	20.10	83.31	88.97	72.24	56.32	0.83	0.592	0.009	0.013
16:26:37	9.50	20.10	86.48	92.89	72.90	56.85	0.83	0.592	0.010	0.013
16:27:07	9.40	20.00	86.45	92.89	72.57	56.85	0.83	0.592	0.010	0.013
16:27:37	9.00	20.35	84.19	94.90	73.23	57.38	0.83	0.592	0.010	0.013
16:28:07	8.90	20.35	82.63	92.93	72.90	57.38	0.83	0.591	0.010	0.013

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
16:28:37	9.00	20.70	83.54	92.93	74.23	57.38	0.83	0.591	0.010	0.014
16:29:07	9.10	20.55	87.42	93.97	74.56	58.20	0.83	0.591	0.010	0.014
16:29:37	9.10	20.65	84.30	95.94	74.23	58.19	0.83	0.591	0.010	0.014
16:30:07	9.30	20.60	85.06	95.94	74.23	58.19	0.83	0.591	0.010	0.014
16:30:37	9.10	20.80	82.05	92.97	74.23	57.92	0.83	0.591	0.010	0.014
16:31:07	9.00	20.80	82.05	93.95	74.23	57.92	0.83	0.591	0.010	0.014
16:31:37	8.90	20.60	83.50	94.93	73.89	57.92	0.83	0.591	0.010	0.014
16:32:07	8.40	20.85	82.83	92.95	74.56	57.65	0.83	0.591	0.010	0.014
16:32:37	8.40	20.80	83.58	93.95	74.56	57.92	0.83	0.591	0.010	0.014
16:33:07	8.90	20.70	83.54	92.97	74.23	57.92	0.83	0.591	0.010	0.014
16:33:37	8.70	20.80	85.13	92.01	74.90	57.93	0.83	0.591	0.010	0.014
16:34:07	8.90	20.80	85.13	92.03	74.90	58.20	0.83	0.590	0.010	0.014
16:34:37	8.70	20.70	85.10	94.95	74.56	58.20	0.83	0.591	0.010	0.014
16:35:07	8.50	20.50	86.61	95.93	74.23	57.92	0.83	0.591	0.010	0.014
16:35:37	9.00	20.50	83.46	94.92	73.56	57.65	0.83	0.591	0.010	0.013
16:36:07	10.10	19.85	87.21	96.90	72.24	56.84	0.83	0.592	0.010	0.013
16:36:37	9.90	19.65	85.52	97.91	71.26	56.31	0.83	0.593	0.010	0.013
16:37:07	10.30	19.60	83.10	95.83	70.62	55.78	0.83	0.593	0.009	0.013
16:37:37	10.30	19.45	82.25	94.78	69.98	55.26	0.82	0.594	0.009	0.012
16:38:07	9.70	19.90	80.11	91.77	70.94	55.26	0.83	0.593	0.009	0.013
16:38:37	9.50	20.15	81.00	90.81	71.91	55.52	0.83	0.593	0.009	0.013

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
16:39:07	8.30	20.50	80.40	87.99	72.90	56.05	0.83	0.592	0.009	0.013
16:39:37	8.90	20.45	82.67	91.89	73.23	56.58	0.83	0.592	0.010	0.013
16:40:07	9.20	20.45	82.67	93.86	73.23	56.58	0.83	0.592	0.010	0.013
16:40:37	9.60	20.35	84.19	94.89	73.23	57.11	0.83	0.592	0.010	0.013
16:41:07	9.30	20.35	82.63	92.89	72.90	56.85	0.83	0.592	0.010	0.013
16:41:37	9.10	20.40	83.43	95.89	73.23	57.11	0.83	0.592	0.010	0.013
16:42:07	8.60	20.45	81.13	93.89	72.90	57.11	0.83	0.592	0.010	0.013
16:42:37	8.70	20.40	81.88	91.94	72.90	57.12	0.83	0.591	0.010	0.013
16:43:07	8.90	20.55	81.18	91.94	73.23	57.12	0.83	0.591	0.010	0.013
16:43:37	9.60	20.50	83.46	93.91	73.56	57.38	0.83	0.591	0.010	0.013
16:44:07	8.60	20.60	81.96	93.91	73.56	57.38	0.83	0.591	0.010	0.013
16:44:37	8.80	20.55	82.71	95.93	73.56	57.92	0.83	0.591	0.010	0.013
16:45:07	8.70	20.70	80.49	94.92	73.56	57.65	0.83	0.591	0.010	0.013
16:45:37	8.30	20.80	79.04	93.95	73.56	57.92	0.83	0.591	0.010	0.013
16:46:07	8.70	21.15	79.95	92.01	74.90	57.93	0.83	0.591	0.010	0.014
16:46:37	8.30	20.95	81.35	92.99	74.56	58.20	0.83	0.590	0.010	0.014
16:47:07	8.90	21.20	80.71	93.01	75.24	58.47	0.83	0.590	0.010	0.014
16:47:37	8.80	21.20	82.21	93.01	75.58	58.47	0.83	0.590	0.010	0.014
16:48:07	8.70	21.20	82.21	94.00	75.58	58.74	0.83	0.590	0.010	0.014
16:48:37	8.50	21.45	83.07	93.07	76.61	59.29	0.83	0.589	0.010	0.014
16:49:07	8.40	21.35	86.10	93.09	76.95	59.57	0.83	0.589	0.010	0.014

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
16:49:37	8.50	21.40	85.34	94.07	76.95	59.85	0.83	0.589	0.010	0.014
16:50:07	8.70	21.55	84.63	94.07	77.30	59.85	0.83	0.589	0.010	0.014
16:50:37	9.10	21.40	85.34	93.11	76.95	59.85	0.83	0.589	0.010	0.014
16:51:07	9.30	21.30	86.86	96.01	76.95	59.85	0.83	0.589	0.010	0.015
16:51:37	7.80	21.40	83.81	96.01	76.61	59.85	0.83	0.589	0.010	0.014
16:52:07	8.20	21.30	82.26	95.99	75.92	59.29	0.83	0.590	0.010	0.014
16:52:37	8.50	21.30	82.26	95.96	75.92	58.74	0.83	0.590	0.010	0.014
16:53:07	8.30	21.40	79.33	93.01	75.58	58.47	0.83	0.590	0.010	0.014
16:53:37	8.70	21.20	80.71	93.97	75.24	58.20	0.83	0.591	0.010	0.014
16:54:07	9.10	21.30	80.76	93.97	75.58	58.20	0.83	0.591	0.010	0.014
16:54:37	9.20	21.20	80.71	93.98	75.24	58.47	0.83	0.590	0.010	0.014
16:55:07	8.50	21.30	79.28	95.94	75.24	58.19	0.83	0.591	0.010	0.014
16:55:37	9.10	21.05	81.40	94.93	74.90	57.92	0.83	0.591	0.010	0.014
16:56:07	9.40	20.95	79.85	95.92	74.23	57.65	0.83	0.591	0.010	0.013
16:56:37	8.80	20.75	79.76	94.89	73.56	57.11	0.83	0.592	0.010	0.013
16:57:07	9.10	20.65	78.22	92.89	72.90	56.85	0.83	0.592	0.010	0.013
16:57:37	9.80	20.40	80.35	94.86	72.57	56.58	0.83	0.592	0.010	0.013
16:58:07	9.80	20.40	78.84	94.86	72.24	56.58	0.83	0.592	0.010	0.013
16:58:37	9.10	20.40	78.84	91.86	72.24	56.32	0.83	0.592	0.009	0.013
16:59:07	9.70	20.40	78.84	93.86	72.24	56.58	0.83	0.592	0.010	0.013
16:59:37	9.10	20.40	78.84	93.86	72.24	56.58	0.83	0.592	0.010	0.013

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
17:00:07	9.70	20.40	78.84	91.89	72.24	56.58	0.83	0.592	0.010	0.013
17:00:37	9.50	20.40	78.84	93.86	72.24	56.58	0.83	0.592	0.010	0.013
17:01:07	9.50	20.50	78.89	90.92	72.57	56.58	0.83	0.592	0.009	0.013
17:01:37	9.00	20.35	79.57	94.86	72.24	56.58	0.83	0.592	0.010	0.013
17:02:07	9.10	20.35	79.57	95.85	72.24	56.31	0.83	0.593	0.010	0.013
17:02:37	9.80	20.00	80.16	93.80	71.27	55.79	0.83	0.593	0.009	0.013
17:03:37	9.40	20.15	76.47	93.79	70.94	55.52	0.83	0.593	0.009	0.012
17:04:07	10.00	20.15	76.47	94.78	70.94	55.26	0.82	0.594	0.009	0.012
17:04:37	9.90	20.10	77.19	90.75	70.94	55.00	0.83	0.593	0.009	0.012
17:05:07	8.70	19.95	79.37	90.75	70.94	55.00	0.83	0.593	0.009	0.013
17:05:37	9.50	19.95	79.37	93.77	70.94	55.26	0.82	0.594	0.009	0.013
17:06:07	8.90	20.20	77.24	91.79	71.27	55.52	0.83	0.593	0.009	0.012
17:06:37	9.30	20.30	77.29	90.84	71.59	55.79	0.83	0.592	0.009	0.013
17:07:07	9.20	20.55	78.17	91.84	72.57	56.05	0.83	0.592	0.009	0.013
17:07:37	9.10	20.65	79.71	91.89	73.23	56.58	0.83	0.592	0.010	0.013
17:08:07	8.80	20.70	78.99	91.89	73.23	56.58	0.83	0.592	0.010	0.013
17:08:37	9.30	20.85	78.32	92.91	73.56	57.12	0.83	0.591	0.010	0.013
17:09:07	9.10	20.65	82.75	93.91	73.89	57.38	0.83	0.591	0.010	0.013
17:09:37	9.50	20.25	84.15	96.91	72.90	57.38	0.83	0.592	0.010	0.013
17:10:07	9.30	20.10	83.31	100.00	72.24	56.84	0.83	0.593	0.010	0.013
17:10:37	10.00	19.75	82.38	100.00	70.94	56.05	0.82	0.594	0.010	0.013

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
17:11:37	9.80	19.85	77.80	94.76	70.30	55.00	0.82	0.594	0.009	0.012
17:12:07	9.30	20.05	76.41	91.72	70.62	54.74	0.82	0.594	0.009	0.012
17:13:07	9.80	20.20	77.24	91.74	71.27	55.00	0.83	0.593	0.009	0.012
17:13:37	8.90	20.25	76.53	91.77	71.27	55.26	0.83	0.593	0.009	0.012
17:14:07	8.10	20.45	78.12	90.81	72.24	55.52	0.83	0.593	0.009	0.013
17:14:37	9.00	20.60	78.94	91.84	72.90	56.05	0.83	0.592	0.009	0.013
17:16:37	8.50	20.85	81.31	93.89	74.23	57.11	0.83	0.592	0.010	0.013
17:17:07	10.00	20.60	81.96	96.90	73.56	57.11	0.83	0.592	0.010	0.013
17:17:37	10.00	20.40	81.88	94.86	72.90	56.58	0.83	0.592	0.010	0.013
17:18:07	9.80	20.20	80.26	96.87	71.91	56.05	0.83	0.593	0.010	0.013
17:18:37	9.80	20.20	80.26	94.80	71.91	55.52	0.83	0.593	0.009	0.013
17:19:07	9.50	20.15	77.96	94.78	71.27	55.26	0.82	0.594	0.009	0.013
17:19:37	9.40	19.95	77.86	95.80	70.62	55.26	0.82	0.594	0.009	0.012
17:20:07	9.80	19.95	77.86	94.76	70.62	55.00	0.82	0.594	0.009	0.012
17:20:37	10.00	20.15	79.47	90.78	71.59	55.26	0.83	0.593	0.009	0.013
17:21:07	9.10	20.45	79.62	89.87	72.57	55.79	0.83	0.592	0.009	0.013
17:21:37	9.70	20.60	80.44	89.95	73.23	56.58	0.83	0.592	0.009	0.013
17:22:07	9.00	20.75	81.27	91.91	73.89	56.85	0.83	0.592	0.010	0.013
17:22:37	9.10	20.85	81.31	92.93	74.23	57.38	0.83	0.591	0.010	0.013
17:23:07	8.70	20.90	82.09	93.93	74.56	57.65	0.83	0.591	0.010	0.014
17:23:37	8.70	20.95	82.87	91.98	74.90	57.65	0.83	0.591	0.010	0.014

Time	$T_{ambient}$-T_{air}	$T_{bulk,air}$	$RH_{inle,tair}$	$RH_{outlet,air}$	$h_{inlet,air}$	$h_{outlet,air}$	$V'_{outlet,air}$	$m'_{dry,air}$	$W_{outlet,air}$	$W_{inlet,air}$
	°C	°C	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})
17:24:07	8.90	20.95	82.87	92.95	74.90	57.65	0.83	0.591	0.010	0.014
17:24:37	8.80	21.25	79.99	92.01	75.24	57.93	0.83	0.591	0.010	0.014
17:25:07	8.90	21.05	81.40	95.93	74.90	57.92	0.83	0.591	0.010	0.014
17:25:37	8.40	21.00	83.66	93.97	75.24	58.20	0.83	0.591	0.010	0.014
17:26:07	7.30	21.05	82.91	92.05	75.24	58.47	0.83	0.590	0.010	0.014
17:26:37	7.50	21.20	83.73	93.03	75.92	58.74	0.83	0.590	0.010	0.014
17:27:07	7.40	21.15	84.48	94.00	75.92	58.74	0.83	0.590	0.010	0.014
17:27:37	7.40	21.10	83.70	95.97	75.58	59.02	0.83	0.590	0.010	0.014
17:28:07	7.40	21.15	82.95	94.99	75.58	59.02	0.83	0.590	0.010	0.014
17:28:37	7.70	21.00	85.20	94.04	75.58	59.29	0.83	0.590	0.010	0.014
17:29:07	6.80	21.20	80.71	95.99	75.24	59.29	0.83	0.590	0.010	0.014

Table C.2 Calculation results of the normal air-conditioner (Continued).

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
15:31:07	0.004	0.002	95.00081664	10.0355	0.2202	10.2558	5.4000	2.3896	4.2918	14.6443
15:31:37	0.004	0.002	95.00081664	10.2181	0.2178	10.4360	5.1000	2.3629	4.4166	15.0700
15:32:07	0.004	0.002	95.62824192	10.2017	0.2234	10.4251	5.1000	2.3629	4.4120	15.0544
15:32:37	0.004	0.002	94.37337938	9.9983	0.2196	10.2179	5.6000	2.4074	4.2444	14.4824
15:33:07	0.004	0.002	95.20995972	9.9985	0.2125	10.2110	5.4000	2.3896	4.2731	14.5805
15:33:37	0.004	0.002	94.37337938	10.0923	0.2140	10.3064	5.3000	2.3807	4.3291	14.7716
15:34:07	0.004	0.002	94.37337938	10.2627	0.2181	10.4807	5.8000	2.4252	4.3216	14.7459
15:34:37	0.004	0.002	94.79167223	10.4327	0.2185	10.6512	5.5000	2.3985	4.4408	15.1526
15:35:07	0.004	0.002	93.95508113	10.4324	0.2256	10.6580	5.2000	2.3718	4.4936	15.3329
15:35:37	0.004	0.002	93.74592995	10.2215	0.2196	10.4410	5.3000	2.3807	4.3857	14.9646
15:36:07	0.004	0.002	94.58252648	10.2251	0.2103	10.4355	5.1000	2.3629	4.4164	15.0693
15:36:37	0.004	0.002	93.5367774	10.2590	0.2272	10.4862	5.9000	2.4341	4.3081	14.6997
15:37:07	0.004	0.002	93.95508113	10.0955	0.2154	10.3109	5.2000	2.3718	4.3473	14.8336
15:37:37	0.004	0.002	93.74592995	10.0551	0.2134	10.2685	5.3000	2.3807	4.3132	14.7173
15:38:07	0.004	0.002	93.32762347	10.0549	0.2169	10.2718	5.7000	2.4163	4.2511	14.5052
15:38:37	0.004	0.002	93.11846816	10.2246	0.2226	10.4472	5.7000	2.4163	4.3236	14.7529
15:39:07	0.004	0.002	92.4909938	10.1869	0.2219	10.4088	6.3000	2.4697	4.2146	14.3809
15:39:37	0.004	0.002	93.95508113	10.1875	0.2097	10.3972	5.1000	2.3629	4.4002	15.0141
15:40:07	0.004	0.002	92.4909938	10.1836	0.2240	10.4076	5.9000	2.4341	4.2758	14.5895
15:40:37	0.004	0.002	91.65434144	9.7757	0.2095	9.9851	6.0000	2.4430	4.0872	13.9462

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
15:41:07	0.004	0.002	92.28183285	10.1902	0.2215	10.4117	6.6000	2.4964	4.1707	14.2310
15:41:37	0.004	0.002	92.4909938	10.1463	0.2182	10.3646	5.7000	2.4163	4.2894	14.6361
15:42:07	0.004	0.002	92.90931144	10.1871	0.2185	10.4056	5.6000	2.4074	4.3223	14.7484
15:42:37	0.004	0.002	92.07267048	9.9809	0.2156	10.1965	5.8000	2.4252	4.2044	14.3460
15:43:07	0.004	0.002	92.07267048	9.9809	0.2156	10.1965	6.0000	2.4430	4.1738	14.2415
15:43:37	0.004	0.002	92.28183285	10.1058	0.2163	10.3221	5.9000	2.4341	4.2406	14.4696
15:44:07	0.004	0.002	92.70015333	9.8088	0.2087	10.0175	5.5000	2.3985	4.1766	14.2510
15:44:37	0.004	0.002	91.86350668	9.8149	0.2113	10.0263	6.6000	2.4964	4.0163	13.7042
15:45:07	0.004	0.002	91.44517475	10.1222	0.2125	10.3347	6.8000	2.5142	4.1105	14.0257
15:45:37	0.004	0.002	90.60849336	9.9107	0.2139	10.1246	6.5000	2.4875	4.0702	13.8881
15:46:07	0.004	0.002	91.86350668	9.9344	0.2179	10.1524	5.3000	2.3807	4.2645	14.5509
15:46:37	0.004	0.002	91.86350668	10.1023	0.2218	10.3241	6.7000	2.5053	4.1209	14.0611
15:47:07	0.004	0.002	91.2360066	9.9407	0.2188	10.1595	6.0000	2.4430	4.1586	14.1898
15:47:37	0.004	0.002	91.02683699	9.7429	0.2068	9.9497	5.8000	2.4252	4.1026	13.9987
15:48:07	0.004	0.002	91.02683699	9.8780	0.2028	10.0808	5.7000	2.4163	4.1720	14.2355
15:48:37	0.004	0.002	90.60849336	9.8321	0.2068	10.0389	6.3000	2.4697	4.0648	13.8697
15:49:07	0.004	0.002	89.98096674	9.3022	0.1909	9.4931	6.5000	2.4875	3.8163	13.0218
15:49:37	0.003	0.002	89.56260814	9.1070	0.1809	9.2879	6.3000	2.4697	3.7608	12.8322
15:50:07	0.004	0.002	89.14424344	9.2372	0.1846	9.4218	6.9000	2.5231	3.7342	12.7417
15:50:37	0.003	0.002	88.72587259	9.2065	0.1805	9.3870	6.4000	2.4786	3.7872	12.9226
15:51:07	0.003	0.002	88.51668483	9.1669	0.1808	9.3477	6.5000	2.4875	3.7579	12.8224

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
15:52:07	0.004	0.002	89.14424344	9.5659	0.1940	9.7599	6.3000	2.4697	3.9519	13.4843
15:52:37	0.004	0.002	89.56260814	9.7925	0.2116	10.0041	5.9000	2.4341	4.1100	14.0239
15:53:07	0.004	0.003	89.56260814	10.1604	0.2245	10.3849	6.3000	2.4697	4.2049	14.3478
15:53:37	0.004	0.002	90.19014378	10.0048	0.2097	10.2145	5.9000	2.4341	4.1964	14.3188
15:54:07	0.004	0.002	91.02683699	10.1611	0.2130	10.3740	5.7000	2.4163	4.2934	14.6495
15:54:37	0.004	0.002	89.98096674	10.2112	0.2186	10.4298	6.0000	2.4430	4.2693	14.5673
15:55:07	0.004	0.002	89.98096674	10.0014	0.2134	10.2149	5.8000	2.4252	4.2120	14.3718
15:55:37	0.004	0.002	89.7717882	10.0013	0.2151	10.2164	6.6000	2.4964	4.0925	13.9640
15:56:07	0.004	0.002	90.39931931	10.2046	0.2195	10.4241	5.9000	2.4341	4.2825	14.6126
15:56:37	0.004	0.002	90.81766591	10.2048	0.2162	10.4209	5.9000	2.4341	4.2812	14.6082
15:57:07	0.004	0.002	89.98096674	10.2044	0.2228	10.4272	6.5000	2.4875	4.1918	14.3031
15:57:37	0.004	0.002	90.39931931	10.0415	0.2137	10.2551	5.5000	2.3985	4.2756	14.5891
15:58:07	0.004	0.002	89.7717882	10.2077	0.2223	10.4300	6.1000	2.4519	4.2539	14.5147
15:58:37	0.004	0.003	90.19014378	10.4152	0.2264	10.6416	6.3000	2.4697	4.3089	14.7024
15:59:07	0.004	0.003	90.19014378	10.4083	0.2305	10.6388	6.1000	2.4519	4.3390	14.8053
16:00:07	0.004	0.002	87.67991811	9.7467	0.1989	9.9456	7.0000	2.5320	3.9280	13.4027
16:00:37	0.003	0.002	86.21551467	9.4118	0.1778	9.5896	7.3000	2.5587	3.7479	12.7882
16:01:07	0.003	0.002	83.91414483	9.2793	0.1725	9.4518	7.7000	2.5943	3.6433	12.4314
16:01:37	0.003	0.002	84.12336881	8.9766	0.1549	9.1314	7.0000	2.5320	3.6064	12.3056
16:02:37	0.003	0.002	85.58788861	8.9880	0.1624	9.1504	6.5000	2.4875	3.6785	12.5517
16:03:07	0.004	0.002	87.05232636	9.4679	0.1881	9.6560	6.4000	2.4786	3.8958	13.2929

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
16:03:37	0.004	0.002	88.72587259	9.9674	0.2093	10.1767	6.0000	2.4430	4.1657	14.2138
16:04:07	0.004	0.002	88.72587259	9.3131	0.1951	9.5082	6.0000	2.4430	3.8920	13.2801
16:04:37	0.004	0.002	89.98096674	9.8351	0.2097	10.0448	6.1000	2.4519	4.0967	13.9786
16:05:07	0.004	0.002	90.19014378	9.8352	0.2081	10.0432	6.0000	2.4430	4.1110	14.0274
16:05:37	0.004	0.002	89.7717882	10.0378	0.2207	10.2585	6.5000	2.4875	4.1240	14.0718
16:06:07	0.004	0.002	89.35342656	9.6583	0.2172	9.8754	6.1000	2.4519	4.0277	13.7430
16:06:37	0.004	0.002	90.19014378	9.5073	0.1964	9.7038	6.1000	2.4519	3.9577	13.5041
16:07:07	0.004	0.002	89.7717882	9.6649	0.2098	9.8747	6.0000	2.4430	4.0420	13.7919
16:07:37	0.004	0.002	89.14424344	9.5069	0.2048	9.7117	6.5000	2.4875	3.9042	13.3216
16:08:07	0.004	0.002	88.30749551	9.4686	0.2079	9.6765	6.8000	2.5142	3.8487	13.1324
16:08:37	0.004	0.002	86.84312588	9.2360	0.2027	9.4386	7.1000	2.5409	3.7147	12.6750
16:09:07	0.003	0.002	83.91414483	8.5643	0.1693	8.7336	8.0000	2.6210	3.3322	11.3698
16:09:37	0.003	0.002	80.77557161	7.9997	0.1448	8.1445	9.0000	2.7100	3.0053	10.2546
16:12:07	0.003	0.002	80.14780744	8.1548	0.1312	8.2860	8.1000	2.6299	3.1507	10.7506
16:12:37	0.003	0.002	79.72928853	8.2207	0.1383	8.3590	8.8000	2.6922	3.1049	10.5943
16:13:07	0.003	0.002	80.56631877	8.3651	0.1425	8.5075	8.6000	2.6744	3.1811	10.8544
16:13:37	0.003	0.002	80.14780744	8.4031	0.1448	8.5479	8.8000	2.6922	3.1750	10.8337
16:14:07	0.003	0.002	79.52002622	8.4292	0.1560	8.5852	8.6000	2.6744	3.2101	10.9535
16:14:37	0.003	0.002	80.77557161	8.4334	0.1450	8.5783	7.7000	2.5943	3.3066	11.2826
16:15:07	0.003	0.002	79.93854894	8.4594	0.1578	8.6173	8.5000	2.6655	3.2329	11.0311
16:15:37	0.003	0.002	78.68295764	8.2838	0.1517	8.4355	9.2000	2.7278	3.0924	10.5517

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
16:16:07	0.003	0.002	77.2180119	8.0201	0.1350	8.1551	9.0000	2.7100	3.0093	10.2681
16:16:37	0.003	0.002	78.26441164	7.9595	0.1218	8.0812	8.6000	2.6744	3.0217	10.3105
16:20:07	0.003	0.002	83.49569165	8.5799	0.1711	8.7510	7.7000	2.5943	3.3732	11.5097
16:20:37	0.004	0.002	83.49569165	8.8077	0.1826	8.9903	7.7000	2.5943	3.4654	11.8244
16:21:07	0.004	0.002	82.4495278	8.6131	0.1819	8.7950	8.2000	2.6388	3.3329	11.3725
16:21:37	0.003	0.002	83.07723144	8.3630	0.1571	8.5201	7.7000	2.5943	3.2841	11.2060
16:22:07	0.003	0.002	81.19407169	8.1470	0.1543	8.3013	8.8000	2.6922	3.0835	10.5212
16:22:37	0.003	0.002	80.14780744	7.8998	0.1444	8.0442	9.4000	2.7456	2.9299	9.9971
16:23:07	0.003	0.002	79.93854894	8.0275	0.1461	8.1736	9.2000	2.7278	2.9964	10.2242
16:23:37	0.003	0.002	79.72928853	7.7822	0.1323	7.9145	8.8000	2.6922	2.9398	10.0310
16:24:07	0.003	0.002	80.56631877	7.9628	0.1375	8.1003	8.4000	2.6566	3.0491	10.4040
16:24:37	0.004	0.002	82.65876413	8.7231	0.1721	8.8952	7.6000	2.5854	3.4405	11.7396
16:25:07	0.003	0.002	83.07723144	8.6357	0.1701	8.8058	7.5000	2.5765	3.4177	11.6618
16:25:37	0.003	0.002	83.91414483	8.7388	0.1732	8.9120	7.6000	2.5854	3.4470	11.7618
16:26:07	0.004	0.002	84.33259105	8.9199	0.1863	9.1062	7.5000	2.5765	3.5343	12.0596
16:26:37	0.004	0.002	84.33259105	8.9968	0.1887	9.1855	8.1000	2.6299	3.4927	11.9177
16:27:07	0.004	0.002	83.91414483	8.8019	0.1834	8.9853	7.7000	2.5943	3.4635	11.8179
16:27:37	0.004	0.002	85.37867658	8.8728	0.1787	9.0515	7.5000	2.5765	3.5131	11.9872
16:28:07	0.003	0.002	85.37867658	8.6716	0.1741	8.8457	7.3000	2.5587	3.4571	11.7961
16:28:37	0.004	0.002	86.84312588	9.4580	0.1977	9.6557	7.1000	2.5409	3.8001	12.9664
16:29:07	0.004	0.002	86.21551467	9.1655	0.1988	9.3643	7.9000	2.6121	3.5850	12.2324

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
16:29:37	0.004	0.002	86.63392378	8.9737	0.1828	9.1564	7.3000	2.5587	3.5786	12.2105
16:30:07	0.004	0.002	86.42472005	8.9735	0.1844	9.1579	8.3000	2.6477	3.4588	11.8020
16:30:37	0.004	0.002	87.26152522	9.1298	0.1874	9.3173	8.2000	2.6388	3.5309	12.0478
16:31:07	0.004	0.002	87.26152522	9.1329	0.1854	9.3183	7.9000	2.6121	3.5674	12.1724
16:31:37	0.004	0.002	86.42472005	8.9380	0.1811	9.1191	7.4000	2.5676	3.5516	12.1186
16:32:07	0.004	0.002	87.47072246	9.4926	0.1982	9.6909	6.7000	2.5053	3.8682	13.1987
16:32:37	0.004	0.002	87.26152522	9.3312	0.1943	9.5255	7.2000	2.5498	3.7358	12.7470
16:33:07	0.004	0.002	86.84312588	9.1296	0.1907	9.3203	7.2000	2.5498	3.6553	12.4724
16:33:37	0.004	0.002	87.26152522	9.5238	0.2073	9.7311	7.7000	2.5943	3.7510	12.7988
16:34:07	0.004	0.002	87.26152522	9.3588	0.2037	9.5625	7.9000	2.6121	3.6609	12.4914
16:34:37	0.004	0.002	86.84312588	9.1690	0.1920	9.3610	7.9000	2.6121	3.5837	12.2281
16:35:07	0.004	0.002	86.00630764	9.1383	0.1911	9.3294	8.0000	2.6210	3.5595	12.1455
16:35:37	0.004	0.002	86.00630764	8.9054	0.1791	9.0845	7.6000	2.5854	3.5138	11.9895
16:36:07	0.003	0.002	83.28646243	8.6196	0.1719	8.7915	8.3000	2.6477	3.3204	11.3298
16:36:37	0.003	0.002	82.4495278	8.3683	0.1580	8.5263	9.1000	2.7189	3.1359	10.7002
16:37:07	0.003	0.002	82.24028966	8.3026	0.1535	8.4561	8.8000	2.6922	3.1409	10.7174
16:37:37	0.003	0.002	81.61256438	8.2401	0.1502	8.3903	9.0000	2.7100	3.0961	10.5642
16:38:07	0.003	0.002	83.49569165	8.8015	0.1663	8.9677	8.1000	2.6299	3.4099	11.6351
16:38:37	0.004	0.002	84.54181157	9.2149	0.1822	9.3970	7.8000	2.6032	3.6098	12.3172
16:39:07	0.004	0.002	86.00630764	9.4672	0.1961	9.6633	7.9000	2.6121	3.6994	12.6230
16:39:37	0.004	0.002	85.79709896	9.3522	0.1917	9.5439	7.8000	2.6032	3.6662	12.5097

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
16:40:07	0.004	0.002	85.79709896	9.3586	0.1877	9.5463	8.0000	2.6210	3.6422	12.4278
16:40:37	0.004	0.002	85.37867658	9.0362	0.1821	9.2183	8.0000	2.6210	3.5171	12.0008
16:41:07	0.004	0.002	85.37867658	8.9975	0.1809	9.1784	7.8000	2.6032	3.5258	12.0305
16:41:37	0.004	0.002	85.58788861	9.0394	0.1785	9.2179	8.0000	2.6210	3.5170	12.0003
16:42:07	0.003	0.002	85.79709896	8.8381	0.1723	9.0103	8.8000	2.6922	3.3468	11.4199
16:42:37	0.004	0.002	85.58788861	8.8319	0.1778	9.0098	7.9000	2.6121	3.4492	11.7693
16:43:07	0.004	0.002	86.21551467	9.0275	0.1817	9.2092	7.6000	2.5854	3.5620	12.1540
16:43:37	0.004	0.002	86.00630764	9.0662	0.1845	9.2508	7.8000	2.6032	3.5536	12.1254
16:44:07	0.004	0.002	86.42472005	9.0665	0.1813	9.2478	7.6000	2.5854	3.5769	12.2050
16:44:37	0.003	0.002	86.21551467	8.7442	0.1720	8.9162	7.3000	2.5587	3.4846	11.8901
16:45:07	0.003	0.002	86.84312588	8.9059	0.1725	9.0785	7.4000	2.5676	3.5358	12.0646
16:45:37	0.003	0.002	87.26152522	8.7389	0.1677	8.9066	7.4000	2.5676	3.4688	11.8362
16:46:07	0.004	0.002	88.72587259	9.5246	0.1959	9.7206	7.3000	2.5587	3.7990	12.9628
16:46:37	0.004	0.002	87.88911216	9.1634	0.1879	9.3513	7.2000	2.5498	3.6675	12.5139
16:47:07	0.004	0.002	88.93505879	9.3970	0.1941	9.5911	7.3000	2.5587	3.7484	12.7901
16:47:37	0.004	0.002	88.93505879	9.5975	0.2032	9.8007	6.9000	2.5231	3.8844	13.2540
16:48:07	0.004	0.002	88.93505879	9.4344	0.1975	9.6319	7.1000	2.5409	3.7908	12.9346
16:48:37	0.004	0.002	89.98096674	9.7036	0.2116	9.9152	7.1000	2.5409	3.9022	13.3150
16:49:07	0.004	0.002	89.56260814	9.7390	0.2205	9.9595	7.6000	2.5854	3.8522	13.1443
16:49:37	0.004	0.002	89.7717882	9.5738	0.2130	9.7868	7.3000	2.5587	3.8249	13.0512
16:50:07	0.004	0.002	90.39931931	9.7784	0.2174	9.9958	7.2000	2.5498	3.9202	13.3764

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
16:50:37	0.004	0.002	89.7717882	9.5707	0.2151	9.7857	7.7000	2.5943	3.7720	12.8706
16:51:07	0.004	0.002	89.35342656	9.5800	0.2122	9.7922	7.6000	2.5854	3.7875	12.9235
16:51:37	0.004	0.002	89.7717882	9.3767	0.1995	9.5762	7.1000	2.5409	3.7688	12.8597
16:52:07	0.004	0.002	89.35342656	9.3081	0.1918	9.4999	7.8000	2.6032	3.6493	12.4520
16:52:37	0.004	0.002	89.35342656	9.6424	0.1992	9.8416	8.2000	2.6388	3.7296	12.7258
16:53:07	0.004	0.002	89.7717882	9.5979	0.1965	9.7944	7.3000	2.5587	3.8279	13.0613
16:53:37	0.004	0.002	88.93505879	9.5658	0.1956	9.7615	8.6000	2.6744	3.6500	12.4542
16:54:07	0.004	0.002	89.35342656	9.7667	0.2015	9.9681	8.3000	2.6477	3.7648	12.8461
16:54:37	0.004	0.002	88.93505879	9.4001	0.1920	9.5922	8.0000	2.6210	3.6597	12.4875
16:55:07	0.004	0.002	89.35342656	9.5725	0.1882	9.7606	8.1000	2.6299	3.7114	12.6638
16:55:37	0.004	0.002	88.30749551	9.5340	0.1931	9.7271	7.9000	2.6121	3.7239	12.7063
16:56:07	0.003	0.002	87.88911216	9.3041	0.1799	9.4840	8.5000	2.6655	3.5581	12.1406
16:56:37	0.003	0.002	87.05232636	9.2334	0.1778	9.4113	9.2000	2.7278	3.4501	11.7723
16:57:07	0.003	0.002	86.63392378	8.9983	0.1711	9.1694	7.2000	2.5498	3.5961	12.2705
16:57:37	0.003	0.002	85.58788861	8.9714	0.1701	9.1415	8.9000	2.7011	3.3844	11.5479
16:58:07	0.003	0.002	85.58788861	8.7775	0.1615	8.9390	8.8000	2.6922	3.3203	11.3295
16:58:37	0.003	0.002	85.58788861	8.9301	0.1708	9.1009	7.9000	2.6121	3.4841	11.8883
16:59:07	0.003	0.002	85.58788861	8.7745	0.1635	8.9380	8.3000	2.6477	3.3758	11.5185
16:59:37	0.003	0.002	85.58788861	8.7745	0.1635	8.9380	7.5000	2.5765	3.4690	11.8368
17:00:07	0.003	0.002	85.58788861	8.7685	0.1674	8.9359	8.3000	2.6477	3.3750	11.5159
17:00:37	0.003	0.002	85.58788861	8.7745	0.1635	8.9380	8.7000	2.6833	3.3310	11.3657

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
17:01:07	0.003	0.002	86.00630764	8.9594	0.1748	9.1342	8.6000	2.6744	3.4154	11.6539
17:01:37	0.003	0.002	85.37867658	8.7774	0.1631	8.9405	8.7000	2.6833	3.3319	11.3689
17:02:07	0.003	0.002	85.37867658	8.9422	0.1645	9.1067	8.7000	2.6833	3.3938	11.5802
17:02:37	0.003	0.002	83.91414483	8.6793	0.1610	8.8404	8.8000	2.6922	3.2837	11.2045
17:03:37	0.003	0.002	84.54181157	8.6489	0.1510	8.7999	9.0000	2.7100	3.2472	11.0799
17:04:07	0.003	0.002	84.54181157	8.8115	0.1523	8.9638	8.2000	2.6388	3.3969	11.5908
17:04:37	0.003	0.002	84.33259105	8.9581	0.1650	9.1231	9.0000	2.7100	3.3665	11.4868
17:05:07	0.003	0.002	83.70491912	8.9576	0.1698	9.1274	9.0000	2.7100	3.3680	11.4922
17:05:37	0.003	0.002	83.70491912	8.8078	0.1608	8.9685	8.4000	2.6566	3.3759	11.5192
17:06:07	0.003	0.002	84.75103038	8.8340	0.1617	8.9957	8.7000	2.6833	3.3525	11.4391
17:06:37	0.003	0.002	85.16946287	8.8629	0.1656	9.0285	8.1000	2.6299	3.4330	11.7140
17:07:07	0.003	0.002	86.21551467	9.2855	0.1779	9.4634	7.8000	2.6032	3.6353	12.4042
17:07:37	0.004	0.002	86.63392378	9.3528	0.1853	9.5381	7.8000	2.6032	3.6640	12.5020
17:08:07	0.004	0.002	86.84312588	9.3529	0.1836	9.5366	7.4000	2.5676	3.7142	12.6734
17:08:37	0.003	0.002	87.47072246	9.2274	0.1786	9.4060	6.7000	2.5053	3.7544	12.8107
17:09:07	0.004	0.002	86.63392378	9.2634	0.1885	9.4519	7.9000	2.6121	3.6185	12.3468
17:09:37	0.003	0.002	84.96024747	8.6832	0.1694	8.8526	8.1000	2.6299	3.3661	11.4858
17:10:07	0.003	0.002	84.33259105	8.6293	0.1581	8.7874	8.3000	2.6477	3.3189	11.3245
17:10:37	0.003	0.002	82.86799868	8.3445	0.1459	8.4905	9.6000	2.7634	3.0725	10.4837
17:11:37	0.003	0.002	83.28646243	8.5894	0.1487	8.7382	8.2000	2.6388	3.3114	11.2990
17:12:07	0.003	0.002	84.12336881	8.9292	0.1595	9.0887	9.1000	2.7189	3.3428	11.4061

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
17:13:07	0.003	0.002	84.75103038	9.1526	0.1682	9.3208	8.7000	2.6833	3.4736	11.8526
17:13:37	0.003	0.002	84.96024747	8.9937	0.1634	9.1570	7.6000	2.5854	3.5418	12.0852
17:14:07	0.004	0.002	85.79709896	9.4090	0.1811	9.5902	8.2000	2.6388	3.6343	12.4007
17:14:37	0.004	0.002	86.42472005	9.4804	0.1849	9.6653	7.5000	2.5765	3.7513	12.8001
17:16:37	0.004	0.002	87.47072246	9.6251	0.1943	9.8194	8.3000	2.6477	3.7087	12.6545
17:17:07	0.003	0.002	86.42472005	9.2393	0.1787	9.4180	9.1000	2.7189	3.4639	11.8194
17:17:37	0.004	0.002	85.58788861	9.1661	0.1787	9.3448	8.9000	2.7011	3.4596	11.8048
17:18:07	0.003	0.002	84.75103038	8.9128	0.1622	9.0750	8.9000	2.7011	3.3597	11.4639
17:18:37	0.003	0.002	84.75103038	9.2277	0.1727	9.4004	8.9000	2.7011	3.4802	11.8750
17:19:07	0.003	0.002	84.54181157	9.0027	0.1607	9.1634	8.5000	2.6655	3.4378	11.7302
17:19:37	0.003	0.002	83.70491912	8.6234	0.1486	8.7720	8.6000	2.6744	3.2800	11.1918
17:20:07	0.003	0.002	83.70491912	8.7795	0.1537	8.9332	8.2000	2.6388	3.3853	11.5512
17:20:37	0.004	0.002	84.54181157	9.1820	0.1770	9.3590	7.7000	2.5943	3.6075	12.3094
17:21:07	0.004	0.002	85.79709896	9.4396	0.1884	9.6280	7.8000	2.6032	3.6985	12.6199
17:21:37	0.004	0.002	86.42472005	9.3463	0.1909	9.5372	7.4000	2.5676	3.7144	12.6742
17:22:07	0.004	0.002	87.05232636	9.5837	0.1962	9.7799	7.7000	2.5943	3.7698	12.8629
17:22:37	0.004	0.002	87.47072246	9.4583	0.1928	9.6512	7.8000	2.6032	3.7074	12.6503
17:23:07	0.004	0.002	87.67991811	9.4960	0.1946	9.6906	7.8000	2.6032	3.7226	12.7019
17:23:37	0.004	0.002	87.88911216	9.6887	0.2060	9.8947	6.1000	2.4519	4.0355	13.7698
17:24:07	0.004	0.002	87.88911216	9.6920	0.2040	9.8960	7.4000	2.5676	3.8542	13.1510
17:24:37	0.004	0.002	89.14424344	9.7246	0.2017	9.9263	6.4000	2.4786	4.0048	13.6650

Time	ΔW_{air}	m'_{water}	h_f	$Q_{Fancoil}$ (S)	$Q_{Fancoil}$ (L)	$Q_{Fancoil}$	T_a-T_r	Power	COP_{system}	EER_{system}
	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	°C	(kW_e)	(kW_{th}/kW_e)	(BTU/hr-W)
17:25:07	0.004	0.002	88.30749551	9.5372	0.1910	9.7283	7.1000	2.5409	3.8287	13.0640
17:25:37	0.004	0.002	88.09830463	9.5654	0.2022	9.7676	7.5000	2.5765	3.7910	12.9355
17:26:07	0.004	0.002	88.30749551	9.3935	0.2011	9.5946	6.9000	2.5231	3.8027	12.9753
17:26:37	0.004	0.002	88.93505879	9.6325	0.2087	9.8412	6.6000	2.4964	3.9422	13.4512
17:27:07	0.004	0.002	88.72587259	9.6356	0.2083	9.8439	6.6000	2.4964	3.9432	13.4549
17:27:37	0.004	0.002	88.51668483	9.2737	0.1931	9.4668	6.9000	2.5231	3.7520	12.8025
17:28:07	0.004	0.002	88.72587259	9.2707	0.1934	9.4642	6.6000	2.4964	3.7911	12.9359
17:28:37	0.004	0.002	88.09830463	9.1001	0.1968	9.2969	7.0000	2.5320	3.6718	12.5286
17:29:07	0.003	0.002	88.93505879	8.9063	0.1769	9.0832	6.5000	2.4875	3.6515	12.4596

Appendix D. Calculation results of the modified air-conditioner

Table D.1 Calculation results of the modified air-conditioner at thickness 40 cm.

Time	$Ta_{Cond,i}$-$Ta_{Evap,i}$	$Ta_{Cond,i}$-$Ta_{PCM,i}$	$T_{bulk,air,Evap}$	$RH_{inlet,air,Evap}$	$RH_{outlet,air,Evap}$	$h_{inlet,air,Evap}$	$h_{outlet,air,Evap}$	$V'_{outlet,air,Evap}$	$m'_{dry,air,Evap}$	$W_{inlet,air,Evap}$
	(°C)	(°C)	(°C)	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})
6:28:56	0.50	-1.60	18.75	99.08	93.82	69.98	72.24	0.85	0.369	0.013
6:33:26	2.30	3.60	18.45	83.38	69.31	61.26	53.98	0.83	0.377	0.010
6:38:26	1.50	2.50	18.25	86.16	81.14	62.69	58.20	0.83	0.376	0.011
6:43:26	2.30	5.10	17.65	101.96	134.16	64.74	59.00	0.82	0.381	0.012
6:48:26	3.50	5.30	17.55	101.00	83.61	62.40	52.45	0.82	0.380	0.011
6:53:26	2.60	3.60	18.60	89.72	80.18	63.27	57.66	0.83	0.376	0.011
6:58:26	2.30	3.40	18.45	94.34	118.33	64.74	61.81	0.83	0.378	0.012
7:03:26	4.20	6.40	17.80	107.06	95.73	63.85	53.71	0.82	0.381	0.012
7:08:26	3.40	4.10	18.90	91.54	80.23	63.57	57.93	0.83	0.376	0.011
7:13:26	2.60	3.10	19.00	92.56	93.28	65.34	62.40	0.84	0.375	0.012
7:18:26	4.90	7.30	17.65	112.39	114.89	63.85	54.73	0.82	0.382	0.012
7:23:26	4.80	5.40	19.40	92.42	77.59	63.27	57.39	0.83	0.376	0.011
7:28:26	4.20	4.60	19.90	91.67	86.98	65.34	62.40	0.84	0.374	0.012
7:33:26	6.10	8.30	18.95	112.15	132.82	65.94	59.00	0.82	0.381	0.013
7:38:26	5.10	6.10	18.65	102.97	78.48	63.85	53.98	0.83	0.379	0.012
7:43:26	5.20	5.30	20.00	92.50	79.78	64.45	59.86	0.84	0.375	0.011
7:48:26	4.60	4.80	20.30	92.62	87.96	66.25	63.27	0.84	0.374	0.012
7:53:26	7.70	9.50	19.75	113.18	132.61	66.24	59.55	0.82	0.380	0.013

Time	$Ta_{Cond,i}$-$Ta_{Evap,i}$	$Ta_{Cond,i}$-$Ta_{PCM,i}$	$T_{bulk,air,Evap}$	$RH_{inlet,air,Evap}$	$RH_{outlet,air,Evap}$	$h_{inlet,air,Evap}$	$h_{outlet,air,Evap}$	$V'_{outlet,air,Evap}$	$m'_{dry,air,Evap}$	$W_{inlet,air,Evap}$
	(°C)	(°C)	(°C)	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})
7:58:26	7.80	9.20	19.80	108.04	82.82	64.74	53.21	0.82	0.380	0.012
8:03:26	7.10	7.40	20.85	93.41	74.39	64.45	57.67	0.83	0.376	0.012
8:08:26	4.00	4.00	19.80	91.67	84.45	65.34	62.70	0.84	0.374	0.012
8:13:26	7.80	9.00	20.90	104.85	121.56	67.16	63.26	0.83	0.377	0.013
8:18:26	9.50	11.80	20.25	118.62	146.68	66.54	56.55	0.82	0.383	0.013
8:23:26	7.60	8.40	19.70	105.00	74.81	63.85	53.21	0.83	0.379	0.012
8:28:26	5.20	5.10	19.90	91.56	73.03	63.86	58.48	0.84	0.375	0.011
8:33:26	6.30	6.20	20.95	91.67	82.77	65.34	62.70	0.84	0.374	0.012
8:38:26	6.50	7.70	20.25	103.87	115.75	66.85	63.55	0.83	0.377	0.013
8:43:26	8.50	10.80	19.55	119.81	149.70	66.24	56.55	0.82	0.384	0.013
8:48:26	6.50	6.70	19.65	100.00	70.99	63.85	54.24	0.83	0.378	0.012
8:53:26	5.20	5.20	20.10	92.52	75.73	64.75	59.86	0.84	0.374	0.012
8:58:26	7.50	7.20	21.55	92.58	84.65	65.64	64.16	0.84	0.373	0.012
9:03:26	7.70	8.90	20.85	104.85	122.68	67.16	63.55	0.83	0.377	0.013
9:08:26	9.20	11.20	20.20	119.64	141.71	67.15	57.63	0.82	0.382	0.013
9:13:26	13.30	14.30	22.15	111.24	80.81	64.44	52.45	0.82	0.380	0.012
9:18:26	9.30	8.90	21.55	95.23	70.33	63.86	57.13	0.83	0.375	0.011
9:23:26	8.70	8.40	22.15	91.67	79.35	65.34	61.83	0.84	0.374	0.012
9:28:26	6.40	6.10	21.30	93.55	85.49	66.86	64.16	0.84	0.373	0.012
9:33:26	9.50	10.40	21.25	109.92	121.62	67.16	62.97	0.83	0.377	0.013
9:38:26	11.50	13.20	20.85	123.19	149.37	66.54	57.09	0.82	0.383	0.013

Time	$Ta_{Cond,i}$-$Ta_{Evap,i}$	$Ta_{Cond,i}$-$Ta_{PCM,i}$	$T_{bulk,air,Evap}$	$RH_{inlet,air,Evap}$	$RH_{outlet,air,Evap}$	$h_{inlet,air,Evap}$	$h_{outlet,air,Evap}$	$V'_{outlet,air,Evap}$	$m'_{dry,air,Evap}$	$W_{inlet,air,Evap}$
	(°C)	(°C)	(°C)	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})
9:43:26	15.50	16.60	22.95	113.44	83.41	64.14	51.45	0.82	0.381	0.012
9:48:26	9.60	9.60	21.40	95.19	66.40	62.98	54.50	0.83	0.377	0.011
9:53:26	8.90	8.20	21.65	91.54	72.48	63.57	59.31	0.84	0.374	0.011
9:58:26	9.50	9.10	22.55	90.76	81.13	65.04	62.70	0.84	0.373	0.012
10:01:25	14.00	13.90	23.10	102.97	65.82	63.85	52.97	0.83	0.378	0.012
10:06:58	9.90	9.50	22.35	89.75	72.63	63.57	59.86	0.84	0.374	0.011
10:12:28	6.10	0.00	22.95	84.47	78.65	69.03	66.56	0.84	0.371	0.012
10:17:56	6.70	5.10	24.35	94.85	97.85	76.61	53.96	0.82	0.381	0.015
10:23:16	6.90	5.60	25.05	90.78	91.38	76.95	51.45	0.82	0.382	0.015
10:28:24	6.40	5.50	25.10	91.66	90.58	78.35	53.46	0.82	0.380	0.015
10:33:31	7.00	6.90	25.40	90.84	94.70	78.00	53.96	0.82	0.380	0.015
10:38:30	8.30	7.40	26.25	90.07	91.67	78.35	54.22	0.82	0.380	0.015
10:43:31	5.80	5.90	25.30	88.54	85.74	78.70	53.71	0.82	0.380	0.015
10:48:32	6.90	6.90	26.15	87.04	85.74	79.06	53.71	0.82	0.380	0.015
10:53:31	6.40	6.40	25.50	90.12	89.74	79.06	54.74	0.83	0.379	0.015
10:58:10	5.80	5.40	25.90	86.35	89.74	79.77	54.74	0.83	0.379	0.015
11:02:40	6.80	6.30	26.40	88.69	87.92	80.85	55.53	0.83	0.379	0.016
11:07:10	6.20	6.40	26.20	88.72	92.85	81.21	56.31	0.83	0.379	0.016
11:11:40	5.10	4.80	26.15	83.48	89.80	80.49	55.26	0.83	0.379	0.015
11:16:05	7.60	7.60	27.20	85.70	89.90	80.85	56.05	0.83	0.379	0.016
11:20:15	5.90	6.00	26.25	86.44	88.87	80.85	55.53	0.83	0.379	0.016

Time	$Ta_{Cond,i}$-$Ta_{Evap,i}$	$Ta_{Cond,i}$-$Ta_{PCM,i}$	$T_{bulk,air,Evap}$	$RH_{inlet,air,Evap}$	$RH_{outlet,air,Evap}$	$h_{inlet,air,Evap}$	$h_{outlet,air,Evap}$	$V'_{outlet,air,Evap}$	$m'_{dry,air,Evap}$	$W_{inlet,air,Evap}$
	(°C)	(°C)	(°C)	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})
11:24:19	5.80	6.20	26.40	84.97	86.93	80.85	55.27	0.83	0.379	0.015
11:28:20	6.50	7.00	26.65	85.70	89.80	80.85	55.26	0.83	0.379	0.016
11:32:19	5.40	5.40	26.40	86.56	91.82	82.31	55.79	0.83	0.379	0.016
11:36:19	6.90	7.00	27.15	85.03	84.28	81.58	56.06	0.83	0.378	0.016
11:40:06	6.50	6.70	27.15	85.10	80.71	82.31	56.06	0.83	0.378	0.016
11:43:44	7.20	7.30	27.00	86.47	90.81	81.21	55.52	0.83	0.379	0.016
11:47:18	4.90	5.50	26.05	85.76	87.12	81.58	56.58	0.83	0.378	0.016
11:50:48	6.30	6.40	26.65	85.73	87.05	81.21	56.05	0.83	0.378	0.016
11:54:18	5.10	5.30	26.55	83.63	90.94	81.95	56.85	0.83	0.378	0.016
11:57:48	5.20	4.60	27.00	82.29	89.00	82.68	56.58	0.83	0.378	0.016
12:01:18	5.40	5.30	27.20	83.81	83.52	83.80	56.85	0.83	0.377	0.016
12:04:26	5.70	6.00	26.85	85.89	90.86	83.05	56.05	0.83	0.379	0.016
12:07:32	6.60	7.00	27.40	84.41	87.05	82.68	56.05	0.83	0.378	0.016
12:10:32	6.10	6.40	26.95	85.86	89.90	82.68	56.05	0.83	0.379	0.016
12:13:32	5.50	6.00	27.05	83.74	88.02	83.05	56.32	0.83	0.378	0.016
12:16:32	9.40	10.20	29.00	83.74	87.99	83.05	56.05	0.83	0.378	0.016
12:19:32	7.20	7.50	27.90	83.74	87.95	83.05	55.79	0.83	0.379	0.016
12:22:32	6.30	6.70	27.35	82.21	89.84	81.95	55.53	0.83	0.379	0.016
12:25:29	7.30	7.70	27.75	84.41	87.95	82.68	55.79	0.83	0.379	0.016
12:28:10	6.20	6.90	27.30	83.70	90.92	82.68	56.58	0.83	0.378	0.016
12:30:40	5.90	6.30	27.25	82.99	89.00	82.68	56.58	0.83	0.378	0.016

Time	$Ta_{Cond,i}$-$Ta_{Evap,i}$	$Ta_{Cond,i}$-$Ta_{PCM,i}$	$T_{bulk,air,Evap}$	$RH_{inlet,air,Evap}$	$RH_{outlet,air,Evap}$	$h_{inlet,air,Evap}$	$h_{outlet,air,Evap}$	$V'_{outlet,air,Evap}$	$m'_{dry,air,Evap}$	$W_{inlet,air,Evap}$
	(°C)	(°C)	(°C)	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})
12:33:10	7.40	8.20	28.00	84.48	89.95	83.43	56.58	0.83	0.378	0.016
12:35:40	8.40	9.00	28.70	83.81	83.42	83.80	56.32	0.83	0.378	0.016
12:38:10	7.10	6.40	28.25	82.41	86.20	83.80	56.59	0.83	0.378	0.016
12:40:40	6.80	7.50	28.60	80.43	86.20	84.55	56.59	0.83	0.378	0.016
12:43:10	7.40	8.50	28.40	83.14	88.13	84.18	57.12	0.83	0.378	0.016
12:45:39	7.00	7.40	28.40	81.75	86.24	84.18	56.85	0.83	0.378	0.016
12:48:08	8.70	9.70	29.15	83.91	89.16	84.93	57.93	0.83	0.377	0.017
12:52:02	5.70	6.40	28.05	81.15	85.53	84.93	58.20	0.83	0.377	0.016
12:58:20	6.30	6.50	28.45	80.47	89.13	84.93	57.66	0.83	0.377	0.016
13:04:25	6.20	6.70	28.50	81.23	89.19	85.69	58.20	0.83	0.377	0.017
13:10:29	6.70	7.90	29.05	79.93	86.47	86.08	58.47	0.83	0.377	0.017
13:16:22	5.40	6.80	27.80	79.67	84.32	83.80	56.32	0.83	0.378	0.016
13:22:04	7.60	8.80	29.00	81.15	89.95	84.93	56.58	0.83	0.378	0.016
13:28:24	5.20	6.30	27.40	82.44	90.89	84.18	56.32	0.83	0.379	0.016
13:36:13	7.10	7.80	28.85	81.91	83.52	85.69	56.85	0.83	0.377	0.017
13:45:45	7.90	8.40	29.15	81.87	88.06	85.31	56.58	0.83	0.378	0.017
13:55:15	5.60	6.60	27.80	81.07	84.28	84.18	56.06	0.83	0.378	0.016
14:32:39	6.20	6.80	28.90	82.81	93.03	88.02	58.74	0.83	0.377	0.017
14:37:09	5.60	6.90	28.80	77.96	88.16	86.08	57.39	0.83	0.378	0.017
14:42:09	6.50	7.40	28.95	82.06	92.03	87.24	58.20	0.83	0.377	0.017
14:47:09	7.50	8.70	29.15	81.23	87.27	85.69	57.66	0.83	0.377	0.017

Time	$Ta_{Cond,i}$-$Ta_{Evap,i}$	$Ta_{Cond,i}$-$Ta_{PCM,i}$	$T_{bulk,air,Evap}$	$RH_{inlet,air,Evap}$	$RH_{outlet,air,Evap}$	$h_{inlet,air,Evap}$	$h_{outlet,air,Evap}$	$V'_{outlet,air,Evap}$	$m'_{dry,air,Evap}$	$W_{inlet,air,Evap}$
	(°C)	(°C)	(°C)	(%)	(%)	(kJ/kg)	(kJ/kg)	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})
14:52:09	6.40	7.60	29.40	80.83	82.05	88.41	58.48	0.83	0.376	0.017
14:57:39	6.90	8.50	29.55	80.09	87.31	87.63	57.93	0.83	0.377	0.017
15:02:22	5.80	6.60	28.80	81.42	85.49	87.63	57.93	0.83	0.377	0.017
15:07:01	5.60	7.30	29.00	80.83	87.27	88.41	57.66	0.83	0.377	0.017
15:12:09	5.40	6.50	29.10	79.52	86.31	88.41	57.39	0.83	0.377	0.017
15:14:58	5.50	7.10	28.75	80.05	87.20	87.24	57.12	0.83	0.378	0.017

Table D.2 Calculation results of the modified air-conditioner at thickness 40 cm (Continued).

Time	$W_{outlet,air,Evap}$	$\Delta w_{air,Eap}$	$m'_{water,Evap}$	$h_{f,Evap}$	Q_{Evap} (S)	Q_{Evap} (L)	Q_{Evap}	$T_{PCM,ave}$	$T_{bulk,air,PCM}$	$RH_{air,inlet,PCM}$	$h_{air,inlet,PCM}$
	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	(°C)	(°C)	(%)	(kJ/kg)
6:28:56	0.014	0.000	0.000	78.68	-0.84	-0.01	-0.85	21.43	19.55	89.71	73.23
6:33:26	0.008	0.002	0.001	77.43	2.75	0.07	2.82	20.95	16.65	86.51	58.75
6:38:26	0.009	0.001	0.000	76.59	1.69	0.04	1.73	20.82	17.00	95.17	62.69
6:43:26	0.012	0.000	0.000	74.08	2.19	0.01	2.20	20.60	14.85	121.88	61.81
6:48:26	0.008	0.003	0.001	73.66	3.78	0.09	3.87	20.17	14.80	84.70	53.21
6:53:26	0.009	0.002	0.001	78.06	2.11	0.05	2.17	20.10	16.65	93.23	61.54
6:58:26	0.012	0.000	0.000	77.43	1.11	-0.01	1.10	19.88	16.60	105.96	65.04
7:03:26	0.009	0.003	0.001	74.71	3.86	0.08	3.95	19.37	14.45	92.65	53.97
7:08:26	0.009	0.002	0.001	79.31	2.12	0.06	2.18	19.35	16.70	91.37	61.54
7:13:26	0.011	0.001	0.000	79.73	1.10	0.02	1.12	19.13	17.35	97.15	65.34
7:18:26	0.010	0.002	0.001	74.08	3.48	0.06	3.55	18.78	13.80	104.37	54.99
7:23:26	0.009	0.002	0.001	81.40	2.21	0.06	2.28	18.72	16.55	88.52	60.41
7:28:26	0.011	0.001	0.000	83.50	1.10	0.03	1.13	18.62	17.50	95.29	65.34
7:33:26	0.012	0.001	0.000	79.52	2.64	0.03	2.68	18.17	14.65	114.04	59.84
7:38:26	0.008	0.003	0.001	78.26	3.74	0.10	3.84	18.12	15.50	80.42	54.75
7:43:26	0.010	0.002	0.001	83.91	1.72	0.05	1.78	18.17	17.25	90.64	63.57
7:48:26	0.011	0.001	0.000	85.17	1.11	0.03	1.14	17.97	17.75	95.34	66.55
7:53:26	0.012	0.001	0.000	82.87	2.54	0.03	2.58	17.82	14.85	113.88	60.96
7:58:26	0.008	0.004	0.001	83.08	4.38	0.12	4.50	17.98	15.10	80.07	53.21

Time	$W_{outlet,air,Evap}$	$\Delta w_{air,Eap}$	$m'_{water,Evap}$	$h_{f,Evap}$	Q_{Evap} (S)	Q_{Evap} (L)	Q_{Evap}	$T_{PCM,ave}$	$T_{bulk,air,PCM}$	$RH_{air,inlet,PCM}$	$h_{air,inlet,PCM}$
	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	(°C)	(°C)	(%)	(kJ/kg)
8:03:26	0.009	0.003	0.001	87.47	2.55	0.08	2.63	18.17	16.95	85.06	60.98
8:08:26	0.011	0.001	0.000	83.08	0.99	0.03	1.02	17.50	17.60	93.50	65.95
8:13:26	0.012	0.000	0.000	87.68	1.47	0.01	1.48	17.38	16.15	112.18	65.64
8:18:26	0.011	0.002	0.001	84.96	3.83	0.06	3.89	17.72	14.30	112.02	57.91
8:23:26	0.008	0.004	0.001	82.66	4.03	0.12	4.15	17.87	15.40	73.89	52.96
8:28:26	0.009	0.002	0.001	83.50	2.02	0.07	2.08	17.40	17.20	85.22	62.12
8:33:26	0.011	0.001	0.000	87.89	0.99	0.04	1.02	16.97	17.70	93.52	66.25
8:38:26	0.012	0.000	0.000	84.96	1.24	0.01	1.26	16.67	16.15	112.18	65.64
8:43:26	0.011	0.002	0.001	82.03	3.72	0.05	3.77	16.45	14.25	112.10	57.37
8:48:26	0.008	0.004	0.001	82.45	3.63	0.11	3.74	16.47	16.20	74.70	55.80
8:53:26	0.010	0.002	0.001	84.33	1.83	0.06	1.89	16.48	17.40	89.77	63.86
8:58:26	0.011	0.001	0.000	90.40	0.55	0.03	0.58	16.62	17.85	93.55	66.86
9:03:26	0.012	0.000	0.000	87.47	1.36	0.01	1.37	16.55	16.20	114.26	66.24
9:08:26	0.011	0.002	0.001	84.75	3.64	0.06	3.70	16.20	14.50	112.98	59.28
9:13:26	0.008	0.004	0.002	92.91	4.56	0.15	4.70	15.85	14.90	74.36	51.71
9:18:26	0.009	0.003	0.001	90.40	2.53	0.10	2.62	16.27	17.05	80.72	60.42
9:23:26	0.010	0.001	0.001	92.91	1.31	0.05	1.36	16.48	17.85	90.83	65.95
9:28:26	0.011	0.001	0.000	89.35	1.01	0.04	1.04	16.45	18.15	93.60	67.78
9:33:26	0.012	0.001	0.000	89.14	1.58	0.02	1.60	16.23	15.85	108.11	63.85
9:38:26	0.012	0.002	0.001	87.47	3.62	0.06	3.68	15.95	14.40	110.84	58.19
9:43:26	0.008	0.004	0.002	96.26	4.83	0.16	4.99	15.75	14.60	75.96	51.21

Time	$W_{outlet,air,Evap}$	$\Delta w_{air,Eap}$	$m'_{water,Evap}$	$h_{f,Evap}$	Q_{Evap} (S)	Q_{Evap} (L)	Q_{Evap}	$T_{PCM,ave}$	$T_{bulk,air,PCM}$	$RH_{air,inlet,PCM}$	$h_{air,inlet,PCM}$
	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	(°C)	(°C)	(%)	(kJ/kg)
9:48:26	0.008	0.003	0.001	89.77	3.19	0.11	3.31	15.77	16.50	74.99	56.86
9:53:26	0.009	0.002	0.001	90.82	1.59	0.07	1.66	16.10	17.50	85.42	63.57
9:58:26	0.011	0.001	0.000	94.58	0.88	0.04	0.91	16.20	17.90	91.76	66.55
10:01:25	0.007	0.004	0.002	96.88	4.11	0.16	4.27	15.77	16.10	70.28	54.50
10:06:58	0.009	0.002	0.001	93.75	1.38	0.06	1.45	15.87	17.50	85.38	63.28
10:12:28	0.011	0.001	0.000	96.26	0.92	0.03	0.95	16.57	22.90	50.42	70.96
10:17:56	0.009	0.006	0.002	102.11	8.62	0.22	8.84	17.35	21.85	73.30	72.57
10:23:16	0.008	0.006	0.002	105.04	9.74	0.26	10.00	17.98	22.10	72.02	72.90
10:28:24	0.009	0.006	0.002	105.25	9.47	0.26	9.73	18.25	22.15	76.37	74.57
10:33:31	0.009	0.006	0.002	106.50	9.14	0.24	9.39	18.70	21.80	80.53	73.89
10:38:30	0.009	0.006	0.002	110.06	9.17	0.26	9.42	18.98	22.45	75.00	74.57
10:43:31	0.009	0.006	0.002	106.08	9.49	0.26	9.75	19.17	22.05	79.13	74.23
10:48:32	0.009	0.007	0.002	109.64	9.62	0.27	9.89	19.32	22.45	79.33	75.58
10:53:31	0.009	0.006	0.002	106.92	9.23	0.25	9.48	19.30	22.15	81.44	75.24
10:58:10	0.009	0.006	0.002	108.59	9.50	0.26	9.76	19.37	22.85	77.43	76.95
11:02:40	0.009	0.007	0.002	110.68	9.59	0.28	9.87	19.50	22.90	76.74	76.96
11:07:10	0.009	0.006	0.002	109.85	9.43	0.26	9.69	19.93	22.90	84.76	78.70
11:11:40	0.009	0.006	0.002	109.64	9.56	0.26	9.82	19.92	23.50	76.95	78.35
11:16:05	0.009	0.006	0.002	114.03	9.39	0.27	9.66	20.12	23.15	81.15	78.70
11:20:15	0.009	0.006	0.002	110.06	9.59	0.27	9.86	20.22	23.05	79.56	77.30
11:24:19	0.009	0.006	0.002	110.68	9.69	0.27	9.96	20.38	23.00	80.26	77.30

Time	$W_{outlet,air,Evap}$	$\Delta w_{air,Eap}$	$m'_{water,Evap}$	$h_{f,Evap}$	Q_{Evap} (S)	Q_{Evap} (L)	Q_{Evap}	$T_{PCM,ave}$	$T_{bulk,air,PCM}$	$RH_{air,inlet,PCM}$	$h_{air,inlet,PCM}$
	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	(°C)	(°C)	(%)	(kJ/kg)
11:28:20	0.009	0.006	0.002	111.73	9.70	0.27	9.97	20.48	22.90	81.69	77.30
11:32:19	0.009	0.007	0.003	110.68	10.05	0.28	10.33	20.60	23.50	84.28	81.22
11:36:19	0.009	0.007	0.003	113.82	9.65	0.28	9.93	20.65	23.50	81.23	79.41
11:40:06	0.009	0.007	0.003	113.82	9.91	0.30	10.21	20.72	23.65	85.03	81.58
11:43:44	0.009	0.006	0.002	113.19	9.74	0.28	10.01	20.77	23.35	82.61	79.06
11:47:18	0.009	0.006	0.002	109.22	9.45	0.26	9.71	20.87	23.00	86.35	79.77
11:50:48	0.009	0.006	0.002	111.73	9.52	0.27	9.79	20.93	23.20	83.41	79.77
11:54:18	0.010	0.006	0.002	111.31	9.49	0.26	9.75	21.17	23.70	85.83	82.31
11:57:48	0.009	0.006	0.002	113.19	9.87	0.28	10.15	21.33	24.50	81.07	84.18
12:01:18	0.009	0.007	0.003	114.03	10.17	0.30	10.47	21.50	24.45	86.82	85.69
12:04:26	0.009	0.007	0.003	112.56	10.23	0.29	10.52	21.45	23.70	86.56	82.31
12:07:32	0.009	0.007	0.003	114.86	10.07	0.29	10.37	21.57	23.70	87.33	82.68
12:10:32	0.009	0.007	0.003	112.98	10.08	0.29	10.37	21.57	23.60	86.53	81.95
12:13:32	0.009	0.007	0.003	113.40	10.11	0.29	10.40	21.70	23.70	88.89	83.80
12:16:32	0.009	0.007	0.003	121.55	10.22	0.31	10.53	21.72	23.50	88.82	82.68
12:19:32	0.009	0.007	0.003	116.95	10.32	0.30	10.62	21.77	23.95	85.89	83.05
12:22:32	0.009	0.006	0.002	114.66	10.01	0.28	10.29	21.88	23.75	84.31	81.58
12:25:29	0.009	0.007	0.003	116.33	10.18	0.30	10.48	22.00	23.65	88.10	83.05
12:28:10	0.009	0.006	0.002	114.45	9.88	0.28	10.15	22.05	23.55	89.60	83.05
12:30:40	0.009	0.006	0.002	114.24	9.87	0.28	10.15	22.15	23.80	87.38	83.43
12:33:10	0.009	0.007	0.003	117.37	10.15	0.30	10.45	22.25	23.70	89.60	83.05

Time	$W_{outlet,air,Evap}$	$\Delta w_{air,Eap}$	$m'_{water,Evap}$	$h_{f,Evap}$	Q_{Evap} (S)	Q_{Evap} (L)	Q_{Evap}	$T_{PCM,ave}$	$T_{bulk,air,PCM}$	$RH_{air,inlet,PCM}$	$h_{air,inlet,PCM}$
	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	(°C)	(°C)	(%)	(kJ/kg)
12:35:40	0.009	0.007	0.003	120.30	10.38	0.32	10.70	22.33	24.00	88.15	83.80
12:38:10	0.009	0.007	0.003	118.42	10.28	0.31	10.59	22.52	24.90	80.51	85.31
12:40:40	0.009	0.007	0.003	119.88	10.57	0.32	10.88	22.58	24.30	89.06	86.46
12:43:10	0.009	0.007	0.003	119.05	10.22	0.31	10.53	22.62	23.90	89.62	83.43
12:45:39	0.009	0.007	0.003	119.05	10.32	0.31	10.63	22.68	24.45	86.79	85.31
12:48:08	0.010	0.007	0.003	122.18	10.19	0.31	10.50	22.73	24.10	93.58	86.08
12:52:02	0.010	0.007	0.003	117.58	10.07	0.30	10.37	23.05	24.60	90.59	87.24
12:58:20	0.010	0.007	0.003	119.25	10.30	0.30	10.60	23.33	25.05	85.48	86.85
13:04:25	0.010	0.007	0.003	119.46	10.37	0.31	10.68	23.83	24.90	86.90	86.85
13:10:29	0.010	0.007	0.003	121.76	10.40	0.32	10.71	24.25	24.90	89.06	86.46
13:16:22	0.009	0.007	0.003	116.54	10.38	0.30	10.68	24.37	24.10	88.87	83.43
13:22:04	0.009	0.007	0.003	121.55	10.72	0.32	11.04	24.42	24.30	89.71	84.93
13:28:24	0.009	0.007	0.003	114.86	10.55	0.30	10.84	24.35	23.95	88.10	83.05
13:36:13	0.009	0.007	0.003	120.93	10.88	0.34	11.22	24.37	24.75	86.82	85.69
13:45:45	0.009	0.007	0.003	122.18	10.86	0.33	11.19	24.38	24.80	84.61	84.93
13:55:15	0.009	0.007	0.003	116.54	10.63	0.31	10.94	24.38	24.20	87.41	83.80
14:32:39	0.010	0.007	0.003	121.14	11.04	0.33	11.38	24.78	25.25	86.99	88.02
14:37:09	0.010	0.007	0.003	120.72	10.83	0.32	11.15	24.88	25.00	86.10	85.69
14:42:09	0.010	0.007	0.003	121.34	10.96	0.33	11.29	24.90	25.10	87.63	86.85
14:47:09	0.010	0.007	0.003	122.18	10.58	0.32	10.90	24.75	24.60	87.46	84.55
14:52:09	0.010	0.008	0.003	123.23	11.26	0.36	11.62	24.92	25.20	88.43	88.02

Time	$W_{outlet,air,Evap}$	$\Delta w_{air,Eap}$	$m'_{water,Evap}$	$h_{f,Evap}$	Q_{Evap} (S)	Q_{Evap} (L)	Q_{Evap}	$T_{PCM,ave}$	$T_{bulk,air,PCM}$	$RH_{air,inlet,PCM}$	$h_{air,inlet,PCM}$
	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW)	(°C)	(°C)	(%)	(kJ/kg)
14:57:39	0.010	0.007	0.003	123.85	11.20	0.35	11.55	25.13	24.90	89.82	86.85
15:02:22	0.010	0.008	0.003	120.72	11.19	0.35	11.54	25.13	25.30	85.48	86.85
15:07:01	0.010	0.008	0.003	121.55	11.60	0.36	11.96	25.13	25.10	90.59	87.24
15:12:09	0.009	0.008	0.003	121.97	11.71	0.36	12.07	25.23	25.60	86.28	88.02
15:14:58	0.009	0.008	0.003	120.51	11.37	0.34	11.72	25.25	24.95	89.04	86.08

Table D.3 Calculation results of the modified air-conditioner at thickness 40 cm (Continued).

Time	$V'_{outlet,air,PCM}$	$m'_{dry,air,PCM}$	$W_{air,bed,inlet,PCM}$	$\Delta w_{air,PCM}$	$m'_{water,PCM}$	$h_{f,PCM}$	Q_{PCM}	$Q_{Cooling}$	Power	EER_{system}	EER_{system}
	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW_e)	(kW_{th}/kW_e)	(BTU/h-W)
6:28:56	0.8501	0.368	0.0137	0.0004	0.0002	82.03	0.6617	-0.18	0.00	0	0
6:33:26	0.8317	0.376	0.0098	-0.0005	-0.0002	69.89	-0.4925	2.32	0.00	0	0
6:38:26	0.8349	0.375	0.0112	0.0004	0.0002	71.36	-0.3774	1.35	0.00	0	0
6:43:26	0.8279	0.378	0.0119	0.0000	0.0000	62.35	-0.8753	1.32	2.30	0.57	1.9612
6:48:26	0.8242	0.380	0.0084	-0.0029	-0.0011	62.14	-0.6117	3.26	0.00	0	0
6:53:26	0.8339	0.375	0.0108	-0.0003	-0.0001	69.89	-0.2645	1.90	0.00	0	0
6:58:26	0.8355	0.375	0.0122	0.0006	0.0002	69.68	-0.3017	0.80	0.00	0	0
7:03:26	0.8234	0.380	0.0089	-0.0030	-0.0011	60.68	-0.7270	3.22	0.00	0	0
7:08:26	0.8343	0.375	0.0107	-0.0005	-0.0002	70.10	-0.1511	2.02	0.00	0	0
7:13:26	0.8380	0.374	0.0119	0.0002	0.0001	72.82	-0.1128	1.01	2.31	0.44	1.4951
7:18:26	0.8223	0.381	0.0096	-0.0025	-0.0010	57.95	-0.7663	2.78	2.36	1.18	4.0172
7:23:26	0.8335	0.376	0.0103	-0.0009	-0.0003	69.47	-0.1134	2.16	0.00	0	0
7:28:26	0.8384	0.373	0.0118	0.0002	0.0001	73.45	-0.0752	1.05	0.00	0	0
7:33:26	0.8269	0.379	0.0112	-0.0015	-0.0006	61.52	-0.7240	1.95	2.39	0.82	2.7872
7:38:26	0.8275	0.378	0.0086	-0.0032	-0.0012	65.08	-0.3046	3.54	0.00	0	0
7:43:26	0.8373	0.374	0.0112	-0.0003	-0.0001	72.40	0.0376	1.81	0.00	0	0
7:48:26	0.8400	0.373	0.0122	0.0002	0.0001	74.50	0.0375	1.18	0.00	0	0
7:53:26	0.8284	0.378	0.0114	-0.0014	-0.0005	62.35	-0.5705	2.01	2.43	0.83	2.8236
7:58:26	0.8253	0.379	0.0082	-0.0040	-0.0015	63.40	-0.4581	4.04	0.00	0	0
8:03:26	0.8352	0.375	0.0103	-0.0012	-0.0005	71.15	0.0377	2.67	0.00	0	0

Time	$V'_{outlet,air,PCM}$	$m'_{dry,air,PCM}$	$W_{air,bed,inlet,PCM}$	$\Delta w_{air,PCM}$	$m'_{water,PCM}$	$h_{f,PCM}$	Q_{PCM}	$Q_{Cooling}$	Power	EER_{system}	EER_{system}
	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW_e)	(kW_{th}/kW_e)	(BTU/h-W)
8:08:26	0.8397	0.373	0.0119	0.0002	0.0001	73.87	0.1501	1.17	0.00	0	0
8:13:26	0.8348	0.375	0.0126	-0.0001	0.0000	67.80	-0.2642	1.22	2.43	0.50	1.7141
8:18:26	0.8247	0.380	0.0106	-0.0025	-0.0009	60.05	-0.8405	3.05	2.47	1.23	4.2099
8:23:26	0.8266	0.379	0.0079	-0.0040	-0.0015	64.66	-0.2287	3.92	0.00	0	0
8:28:26	0.8367	0.374	0.0106	-0.0007	-0.0003	72.19	0.1506	2.24	0.00	0	0
8:33:26	0.8401	0.373	0.0120	0.0003	0.0001	74.29	0.1500	1.17	0.00	0	0
8:38:26	0.8348	0.375	0.0126	0.0000	0.0000	67.80	-0.2642	0.99	2.40	0.41	1.4096
8:43:26	0.8240	0.380	0.0105	-0.0026	-0.0010	59.84	-0.9559	2.81	2.45	1.15	3.9217
8:48:26	0.8306	0.377	0.0086	-0.0031	-0.0012	68.01	0.0000	3.74	0.00	0	0
8:53:26	0.8379	0.374	0.0112	-0.0003	-0.0001	73.03	0.0752	1.97	0.00	0	0
8:58:26	0.8409	0.372	0.0122	0.0004	0.0001	74.92	0.1874	0.77	0.00	0	0
9:03:26	0.8351	0.375	0.0128	0.0001	0.0000	68.01	-0.3018	1.07	2.43	0.44	1.5022
9:08:26	0.8264	0.379	0.0110	-0.0023	-0.0009	60.89	-0.6863	3.01	2.46	1.22	4.1772
9:13:26	0.8246	0.380	0.0076	-0.0046	-0.0018	62.56	-0.3057	4.40	0.00	0	0
9:18:26	0.8356	0.375	0.0099	-0.0015	-0.0006	71.57	0.1885	2.81	0.00	0	0
9:23:26	0.8404	0.373	0.0118	0.0001	0.0000	74.92	0.1875	1.55	0.00	0	0
9:28:26	0.8421	0.372	0.0124	0.0002	0.0001	76.17	0.1871	1.23	0.00	0	0
9:33:26	0.8334	0.376	0.0120	-0.0009	-0.0004	66.54	-0.1890	1.42	2.47	0.57	1.9557
9:38:26	0.8253	0.379	0.0106	-0.0026	-0.0010	60.47	-0.7635	2.92	2.52	1.16	3.9562
9:43:26	0.8234	0.380	0.0076	-0.0047	-0.0018	61.31	-0.3827	4.61	0.00	0	0
9:48:26	0.8321	0.376	0.0088	-0.0024	-0.0009	69.26	0.0757	3.38	0.00	0	0

Time	$V'_{outlet,air,PCM}$	$m'_{dry,air,PCM}$	$W_{air,bed,inlet,PCM}$	$\Delta w_{air,PCM}$	$m'_{water,PCM}$	$h_{f,PCM}$	Q_{PCM}	$Q_{Cooling}$	Power	EER_{system}	EER_{system}
	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW_e)	(kW_{th}/kW_e)	(BTU/h-W)
9:53:26	0.8387	0.373	0.0109	-0.0003	-0.0001	73.45	0.3006	1.96	0.00	0	0
9:58:26	0.8409	0.372	0.0120	0.0004	0.0002	75.13	0.2248	1.14	0.00	0	0
10:01:25	0.8300	0.377	0.0080	-0.0037	-0.0014	67.59	0.0759	4.34	0.00	0	0
10:06:58	0.8383	0.374	0.0109	-0.0003	-0.0001	73.45	0.2255	1.67	0.00	0	0
10:12:28	0.8615	0.363	0.0106	-0.0017	-0.0006	96.05	2.2679	3.22	0.00	0	0
10:17:56	0.8544	0.366	0.0126	-0.0022	-0.0008	91.65	0.5532	9.40	2.40	3.91	13.3370
10:23:16	0.8553	0.366	0.0126	-0.0021	-0.0008	92.70	0.5895	10.59	2.41	4.39	14.9953
10:28:24	0.8560	0.366	0.0133	-0.0019	-0.0007	92.91	0.4786	10.21	2.40	4.26	14.5250
10:33:31	0.8537	0.367	0.0133	-0.0017	-0.0006	91.45	0.1477	9.54	2.41	3.95	13.4931
10:38:30	0.8564	0.366	0.0132	-0.0019	-0.0007	94.16	0.4048	9.83	2.44	4.03	13.7351
10:43:31	0.8546	0.366	0.0134	-0.0017	-0.0006	92.49	0.1844	9.93	2.38	4.17	14.2216
10:48:32	0.8563	0.366	0.0137	-0.0014	-0.0005	94.16	0.1840	10.08	2.41	4.18	14.2740
10:53:31	0.8551	0.366	0.0138	-0.0015	-0.0005	92.91	0.1106	9.59	2.40	4.00	13.6509
10:58:10	0.8586	0.365	0.0140	-0.0013	-0.0005	95.84	0.4037	10.16	2.38	4.26	14.5439
11:02:40	0.8589	0.365	0.0139	-0.0017	-0.0006	96.05	0.4403	10.31	2.41	4.28	14.6137
11:07:10	0.8584	0.365	0.0149	-0.0009	-0.0003	96.05	0.0000	9.69	2.39	4.05	13.8224
11:11:40	0.8605	0.364	0.0143	-0.0010	-0.0003	98.56	0.2930	10.11	2.37	4.27	14.5788
11:16:05	0.8596	0.364	0.0147	-0.0008	-0.0003	97.09	0.1833	9.84	2.43	4.06	13.8448
11:20:15	0.8583	0.365	0.0142	-0.0014	-0.0005	96.67	0.1101	9.97	2.39	4.18	14.2625
11:24:19	0.8581	0.365	0.0142	-0.0012	-0.0004	96.46	0.0735	10.04	2.38	4.21	14.3695
11:28:20	0.8576	0.365	0.0143	-0.0012	-0.0004	96.05	0.0000	9.97	2.40	4.16	14.1793

Time	$V'_{outlet,air,PCM}$	$m'_{dry,air,PCM}$	$W_{air,bed,inlet,PCM}$	$\Delta w_{air,PCM}$	$m'_{water,PCM}$	$h_{f,PCM}$	Q_{PCM}	$Q_{Cooling}$	Power	EER_{system}	EER_{system}
	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW_e)	(kW_{th}/kW_e)	(BTU/h-W)
11:32:19	0.8616	0.363	0.0155	-0.0004	-0.0002	98.56	0.1463	10.48	2.37	4.41	15.0605
11:36:19	0.8604	0.364	0.0149	-0.0008	-0.0003	98.56	0.0733	10.00	2.41	4.15	14.1710
11:40:06	0.8618	0.363	0.0157	-0.0002	-0.0001	99.18	0.0366	10.25	2.40	4.27	14.5731
11:43:44	0.8595	0.364	0.0148	-0.0008	-0.0003	97.93	-0.0367	9.98	2.42	4.13	14.0915
11:47:18	0.8592	0.364	0.0153	-0.0005	-0.0002	96.46	0.0000	9.71	2.36	4.11	14.0264
11:50:48	0.8601	0.364	0.0151	-0.0005	-0.0002	97.30	0.1466	9.94	2.39	4.15	14.1562
11:54:18	0.8624	0.363	0.0159	0.0002	0.0001	99.39	0.0731	9.82	2.37	4.15	14.1620
11:57:48	0.8662	0.361	0.0162	0.0003	0.0001	102.74	0.3638	10.51	2.37	4.44	15.1343
12:01:18	0.8661	0.362	0.0169	0.0007	0.0003	102.53	0.1092	10.58	2.37	4.46	15.2049
12:04:26	0.8622	0.363	0.0160	-0.0002	-0.0001	99.39	0.0000	10.52	2.38	4.42	15.0697
12:07:32	0.8624	0.363	0.0161	0.0002	0.0001	99.39	0.0000	10.37	2.40	4.32	14.7273
12:10:32	0.8617	0.363	0.0159	-0.0002	-0.0001	98.97	0.0000	10.37	2.39	4.34	14.8034
12:13:32	0.8632	0.363	0.0165	0.0005	0.0002	99.39	0.0730	10.47	2.38	4.41	15.0387
12:16:32	0.8619	0.363	0.0162	0.0002	0.0001	98.56	0.0000	10.53	2.47	4.27	14.5616
12:19:32	0.8633	0.363	0.0161	0.0001	0.0000	100.44	0.0365	10.66	2.42	4.41	15.0572
12:22:32	0.8620	0.363	0.0156	0.0000	0.0000	99.60	0.0366	10.33	2.39	4.31	14.7150
12:25:29	0.8626	0.363	0.0163	0.0003	0.0001	99.18	0.0365	10.52	2.42	4.35	14.8383
12:28:10	0.8621	0.363	0.0163	0.0004	0.0002	98.77	-0.0366	10.12	2.39	4.23	14.4292
12:30:40	0.8632	0.363	0.0163	0.0005	0.0002	99.81	0.0730	10.22	2.39	4.28	14.6210
12:33:10	0.8621	0.363	0.0163	0.0002	0.0001	99.39	-0.1462	10.31	2.42	4.26	14.5282
12:35:40	0.8634	0.363	0.0165	0.0002	0.0001	100.65	-0.0730	10.63	2.44	4.35	14.8410

Time	$V'_{outlet,air,PCM}$	$m'_{dry,air,PCM}$	$W_{air,bed,inlet,PCM}$	$\Delta w_{air,PCM}$	$m'_{water,PCM}$	$h_{f,PCM}$	Q_{PCM}	$Q_{Cooling}$	Power	EER_{system}	EER_{system}
	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW_e)	(kW_{th}/kW_e)	(BTU/h-W)
12:38:10	0.8678	0.361	0.0165	0.0003	0.0001	104.41	0.3632	10.95	2.41	4.54	15.4850
12:40:40	0.8663	0.361	0.0173	0.0010	0.0004	101.90	0.1455	11.03	2.41	4.58	15.6360
12:43:10	0.8625	0.363	0.0164	0.0002	0.0001	100.23	-0.2192	10.31	2.42	4.26	14.5287
12:45:39	0.8657	0.362	0.0168	0.0006	0.0002	102.53	0.0364	10.66	2.41	4.42	15.0914
12:48:08	0.8644	0.362	0.0174	0.0009	0.0003	101.07	-0.2188	10.28	2.45	4.20	14.3186
12:52:02	0.8667	0.361	0.0176	0.0012	0.0004	103.16	-0.0727	10.30	2.38	4.32	14.7550
12:58:20	0.8679	0.361	0.0172	0.0008	0.0003	105.04	0.0363	10.63	2.39	4.44	15.1492
13:04:25	0.8674	0.361	0.0173	0.0007	0.0002	104.41	0.0000	10.68	2.39	4.46	15.2254
13:10:29	0.8663	0.361	0.0173	0.0006	0.0002	104.41	-0.2911	10.42	2.40	4.33	14.7907
13:16:22	0.8628	0.363	0.0164	0.0004	0.0002	101.07	-0.2922	10.39	2.37	4.38	14.9351
13:22:04	0.8643	0.362	0.0169	0.0005	0.0002	101.90	-0.2188	10.82	2.43	4.46	15.2290
13:28:24	0.8626	0.363	0.0163	0.0000	0.0000	100.44	-0.1827	10.66	2.37	4.50	15.3530
13:36:13	0.8661	0.362	0.0169	0.0003	0.0001	103.78	-0.1092	11.11	2.41	4.60	15.7097
13:45:45	0.8659	0.362	0.0166	0.0001	0.0000	103.99	-0.0728	11.12	2.43	4.57	15.5995
13:55:15	0.8637	0.363	0.0164	0.0003	0.0001	101.48	-0.1460	10.80	2.38	4.54	15.4856
14:32:39	0.8687	0.360	0.0176	0.0002	0.0001	105.87	-0.0363	11.34	2.39	4.74	16.1712
14:37:09	0.8663	0.361	0.0169	0.0004	0.0001	104.83	-0.2183	10.93	2.38	4.60	15.6798
14:42:09	0.8672	0.361	0.0173	0.0002	0.0001	105.25	-0.2181	11.07	2.40	4.61	15.7441
14:47:09	0.8645	0.362	0.0166	0.0000	0.0000	103.16	-0.2916	10.61	2.42	4.38	14.9409
14:52:09	0.8683	0.361	0.0177	0.0003	0.0001	105.67	-0.1452	11.48	2.40	4.79	16.3344
14:57:39	0.8665	0.361	0.0174	0.0003	0.0001	104.41	-0.2910	11.26	2.41	4.67	15.9431

Time	$V'_{outlet,air,PCM}$	$m'_{dry,air,PCM}$	$W_{air,bed,inlet,PCM}$	$\Delta w_{air,PCM}$	$m'_{water,PCM}$	$h_{f,PCM}$	Q_{PCM}	$Q_{Cooling}$	Power	EER_{system}	EER_{system}
	(m^3/kg)	(kg_{dryair}/s)	(kg_{water}/kg_{dryair})	(kg_{water}/kg_{dryair})	(kg_{water}/s)	(kJ/kg)	(kW)	(kW)	(kW_e)	(kW_{th}/kW_e)	(BTU/h-W)
15:02:22	0.8679	0.361	0.0172	0.0000	0.0000	106.08	-0.1453	11.39	2.38	4.78	16.3112
15:07:01	0.8667	0.361	0.0176	0.0002	0.0001	105.25	-0.4364	11.52	2.38	4.84	16.5292
15:12:09	0.8690	0.360	0.0176	0.0003	0.0001	107.34	-0.2176	11.85	2.37	4.99	17.0283
15:14:58	0.8658	0.362	0.0172	0.0002	0.0001	104.62	-0.4004	11.31	2.38	4.76	16.2468

Other calculation results of the modified air-conditioner save in the CD-ROM.