

# Environment

## 단열결로성능평가

### ② 국내 단열기준



1987      1979 가      , 1984      3      2      1980



( :  $m^2 / W$ ,  $kcal/m^2h$  )

(      )      0.58      (0.5)      0.76      (0.65)      1.16      (1.0)

0.41      (0.35)      0.52      (0.45)      0.76      (0.65)

0.47      (0.4)      0.70      (0.6)      0.81      (0.7)

3.37      (2.9)      3.60      (3.1)      5.81      (5.0)



(      ),      ,      :

( : mm )      ( :  $m^2 / W$ ,  $m^2h / kcal$  )

50      1.38(1.60)

(      )      40      1.07(1.25)

30      0.86(1.00)

80      2.15(2.50)

60	1.63(1.90)
40	1.07(1.25)
70	1.89(2.20)
50	1.38(1.60)
40	1.07(1.25)

( )

1. 24 2 6 .
2. ( ) ,  
가 .



(kcal/㎡h )

1	0.45
2	0.45 0.50
3	0.50 0.65



(kcal/㎡h )

1	0.30
2	0.30 0.35
3	0.35 0.45



(kcal/㎡h )

1	0.35
2	0.35 0.40
3	0.40 0.60



(kcal/㎡h )

1	2.5
2	2.5 2.9
3	2.9 3.1

단열성능평가



(Guarded Hot Box) KS, ASTM (Calibrated Hot Box), (Heat Flow Meter)



(a)

가

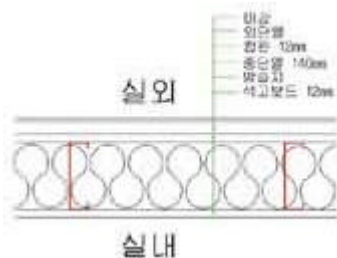


(b)가

< 가 >

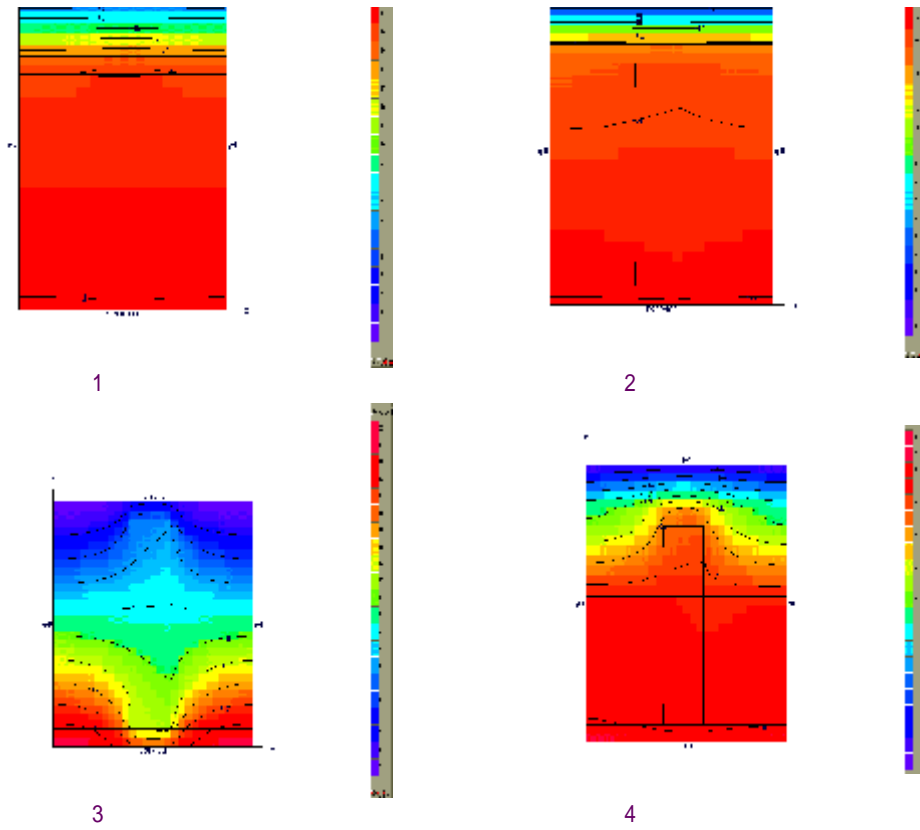


가 「 50mm + 가 「 140mm + 30mm + 가 「 30mm + 50mm + 가 「 140SL12



No.		
1		(50mm)
2		(30mm)
3	+	(30mm)+ (50mm)
4		(140mm)





가 (hot box) 4



No.	가			(W)	(kcal/㎡h )	
	( )	( )	( )			
1	( )	0	20	20	47.84	0.48
2	( )	0	20	20	56.78	0.58
3	+ ( )	0	20	20	42.23	0.42
4	( )	0	20	20	52.50	0.53

30mm +

r

(

30mm)

r

50mm +

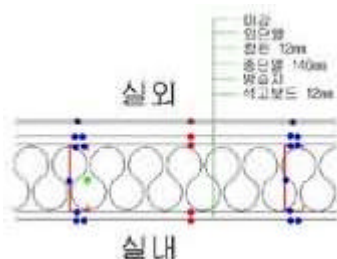
➡ 결로방지성능평가



50% , 가 20 ,  
 20 , 40% , 가 5 5 -10 4

가  
 가

가



(a)



(b)



(c)



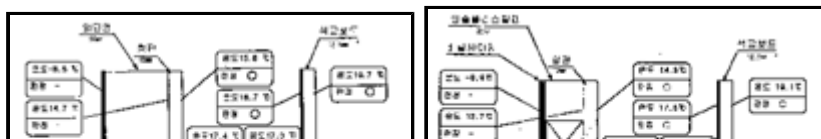
(d)

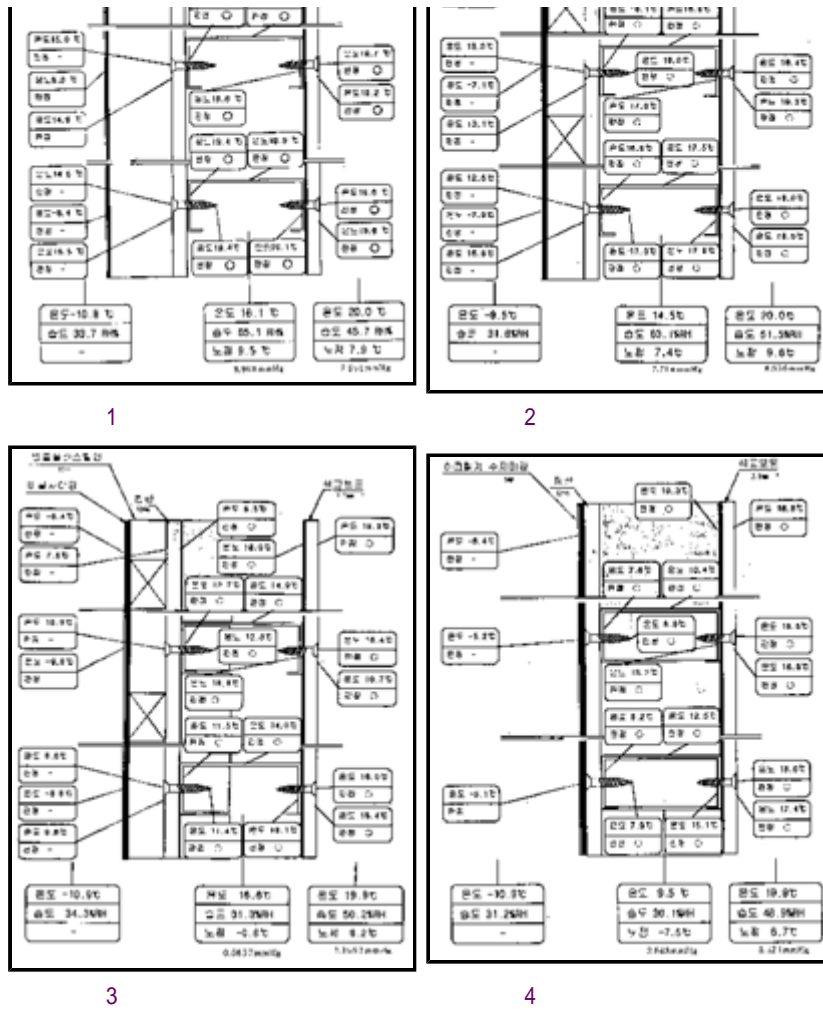


(e)



(e)





➡ 적외선열화상 촬영

▶ 가

(3.5 ) (1.8 ) , (4.9 )가 가 가

가 , 가

가 가 1 2 1 2

가 가 2

400mm 25% 가 600mm 가

가 2.5 가

1





(a)



(b)



(c)



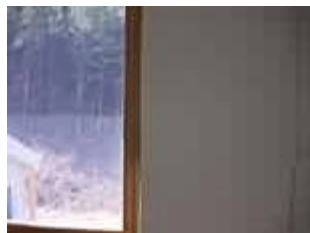
(d)



(e) 1 2



(f) 1 2



(g)



(h)



(i)



(j)



(k)



(l)

<

>

➔ 단열 및 결로방지성능모니터링



thermocouple (T -type)	30	1
HD 8607 (Humidity Sensor)		1
thermocouple (T -type)		7
		422
HD 8607 (Humidity Sensor)		15
(Thermal Imaging Radiometer, THV 550)		

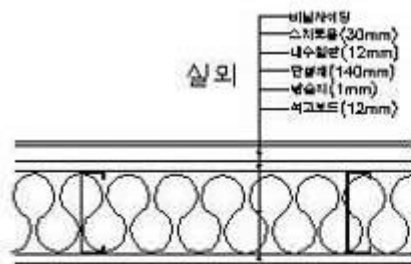
( ) Data Logger : DATASCAN 7300 series



가 446

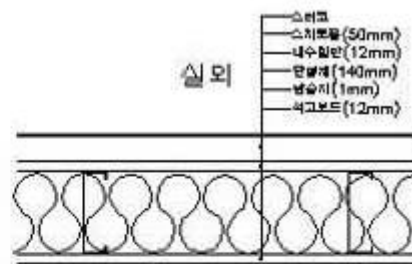
1, 2

가



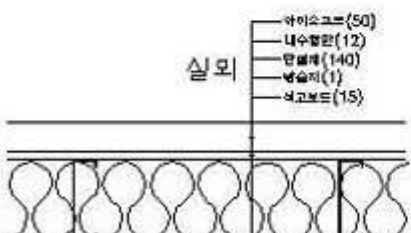
실내

< 외벽 1안 >

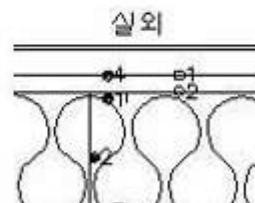


실내

< 외벽 2안 >



실외



실외





실내  
< 외벽 3안 >

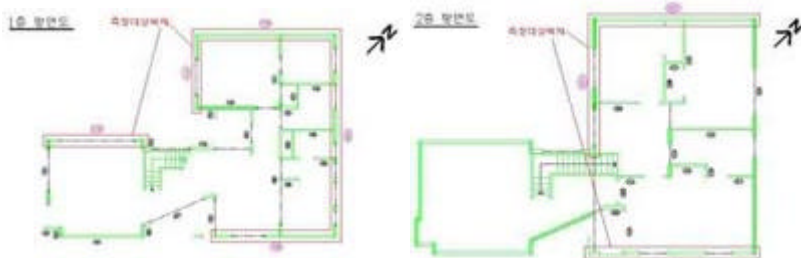


실내  
< numbering 방법 >

< >



가 ( 205)  
< >



1 2  
< >



1	108	1	11	68
1	109	2	9	51
1	110	1	9	51
1	111	3	9	51
1	115	1	6	33
2	201	3	9	66
2	205	1	9	63
2	207	1	9	63
			71	446



가

가)

(time-lag)

(periodic heat flow)

(time lag)가

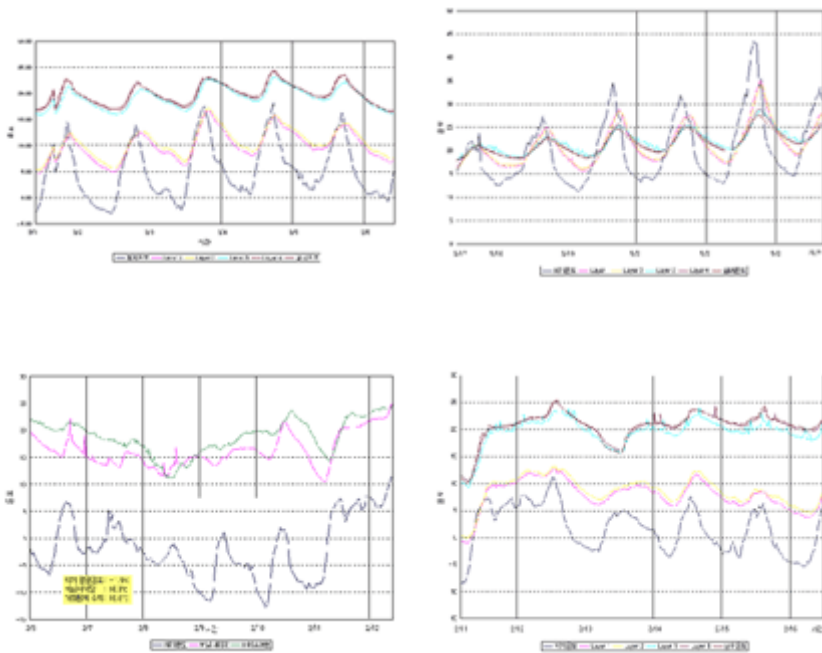
30 1 가 )

가 )

thermal efficiency) 20 40% (TE :

가 (30mm) 가 (50mm)

6 2 12 ) 가 2.5 (1998 2



( 2 )



가)

(Layer) 1 2

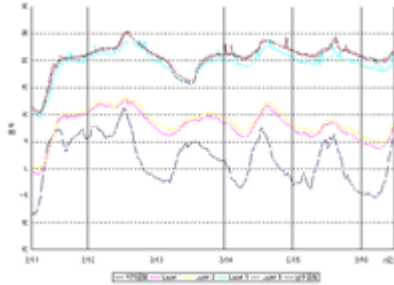
(layer) 1 2

가

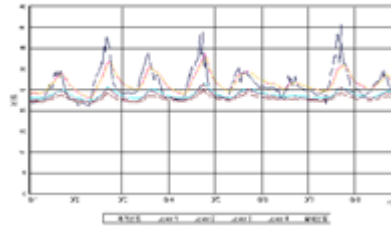
)  
2 5  
(sin)

가  
(月)

가 -12.8



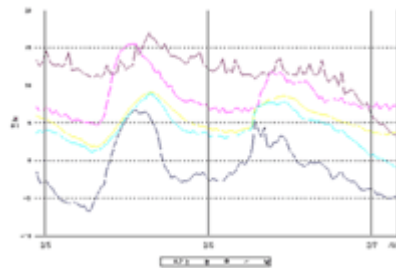
2



8

가

가



▶ 가

( 3,000,000 )

1                      254                      2                      192

(Td) )

Microsoft Visual-C++

```

1. input
1) *.xls *.csv
2) *.csv input rename
2. data
- 1 f_1 data .
- 2 f_2 data .
3. cndnsmfc.exe .
4.
5. " " 가
6.
7. output
    
```

가

1 (2 5 4 59 , -12.8 , 15.53 )

2

1 254 1,747,520

2 192 1,252,224

>> 1. (2 5 4 59 , -12.8 , 15.53 )

1	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	입력번호	날짜	외기온도	송	벽	번호	번호	채널	채널온도	계산온도	습도	노점온도	결과여부		
2	1	99/02/0522:39	-1.48	1	108	1	1	17	10.02	6.83	31.33	-9.04	No		
3	1	99/02/0522:39	-1.48	1	108	1	2	18	8.67	6.83	31.33	-9.04	No		
4	1	99/02/0522:39	-1.48	1	108	1	3	19	12.05	6.83	31.33	-9.04	No		
5	1	99/02/0522:39	-1.48	1	108	1	4	20	5.74	6.83	31.33	-9.04	No		
6	1	99/02/0522:39	-1.48	1	108	1	5	21	18.15	6.83	31.33	-9.04	No		
7	1	99/02/0522:39	-1.48	1	108	4	1	64	11.57	6.83	31.33	-9.04	No		
8	1	99/02/0522:39	-1.48	1	108	4	2	65	12.94	6.83	31.33	-9.04	No		
9	1	99/10/1022:39	-1.48	1	108	4	3	66	15.39	6.83	31.33	-9.04	No		
44198	204	99/02/104:59	-12.80	1	110	8	6	172	13.03	13.49	22.79	-7.39	No		
44199	204	99/02/104:59	-12.80	1	110	3	6	125	8.6	13.49	22.79	-7.39	No		
44200	204	99/02/104:59	-12.80	1	110	6	4	119	9.58	13.49	22.79	-7.39	No		
44201	204	99/02/104:59	-12.80	1	111	1	1	225	13.52	2.69	24.86	-15.61	No		
44202	204	99/02/104:59	-12.80	1	111	1	2	226	18.49	2.69	24.86	-15.61	No		
44203	204	99/02/104:59	-12.80	1	111	1	3	227	14.97	2.69	24.86	-15.61	No		
44204	204	99/02/104:59	-12.80	1	111	1	5	229	14.42	2.69	24.86	-15.61	No		
44205	204	99/02/104:59	-12.80	1	111	4	1	224	4.95	2.69	24.86	-15.61	No		

44206	204	98/02/104-59	-12.80	1	111	4	2	233	6.7	2.69	24.86	-15.61	No		
44207	204	98/02/104-59	-12.80	1	111	4	3	234	16.36	2.69	24.86	-15.61	No		
44208	204	98/02/104-59	-12.80	1	111	7	1	241	11.19	2.69	24.86	-15.61	No		
44209	204	98/02/104-59	-12.80	1	111	7	2	242	13.99	2.69	24.86	-15.61	No		
44210	204	98/02/104-59	-12.80	1	111	7	3	243	13.41	2.69	24.86	-15.61	No		
44211	204	98/02/104-59	-12.80	1	111	7	4	244	7.51	2.69	24.86	-15.61	No		
44212	204	98/02/104-59	-12.80	1	111	7	5	245	15.6	2.69	24.86	-15.61	No		
44213	204	98/02/104-59	-12.80	1	111	2	1	231	7.28	-0.84	24.86	-19.83	No		
44214	204	98/02/104-59	-12.80	1	111	2	2	232	8.34	-0.84	24.86	-19.83	No		
44215	204	98/02/104-59	-12.80	1	111	2	3	236	11.29	-0.84	24.86	-19.83	No		
44216	204	98/02/104-59	-12.80	1	111	2	4	237	7.35	-0.84	24.86	-19.83	No		
44217	204	98/02/104-59	-12.80	1	111	5	1	132	-1.33	-0.84	24.86	-19.83	No		
44218	204	98/02/104-59	-12.80	1	111	5	2	131	-0.34	-0.84	24.86	-19.83	No		
44219	204	98/02/104-59	-12.80	1	111	5	3	130	13.49	-0.84	24.86	-19.83	No		
44220	204	98/02/104-59	-12.80	1	111	8	1	247	1.56	-0.84	24.86	-19.83	No		
44221	204	98/02/104-59	-12.80	1	111	8	2	248	6.87	-0.84	24.86	-19.83	No		
44222	204	98/02/104-59	-12.80	1	111	8	3	253	10.73	-0.84	24.86	-19.83	No		

>> 2. 가

1	A	B	C	D	E	F	G	H	I	J	K	L	M	N
2	일련번호	날짜	층	번	번호	번호	채널	채널온도	계산온도	습도	노건온도	결로여부		
54227	250	98/02/113-59	1	115	4	1	94	2.37	0.54	32.64	-14.14	No		
54228	250	98/02/113-59	1	115	4	2	95	5.5	0.54	32.64	-14.14	No		
54229	250	98/02/113-59	1	115	4	3	96	4.76	0.54	32.64	-14.14	No		
54230	250	98/02/113-59	1	115	4	4	97	0.14	0.54	32.64	-14.14	No		
54231	250	98/02/113-59	1	115	4	5	98	7.79	0.54	32.64	-14.14	No		
54232	250	98/02/113-59	1	115	2	1	80	-1.73	-1.13	32.64	-16.81	No		
54233	250	98/02/113-59	1	115	2	2	87	0.52	-1.13	32.64	16.01	No		
54234	250	98/02/113-59	1	115	2	3	88	11.61	-1.13	32.64	-16.81	No		
54235	250	98/02/113-59	1	115	5	1	100	0.91	-1.13	32.64	-16.81	No		
54236	250	98/02/113-59	1	115	5	2	101	1.85	-1.13	32.64	-16.81	No		
54237	250	98/02/113-59	1	115	5	3	102	3	-1.13	32.64	-16.81	No		
54238	250	98/02/113-59	1	115	5	4	103	-0.88	-1.13	32.64	-16.81	No		
54239	250	98/02/113-59	1	115	5	5	104	7.71	-1.13	32.64	-16.81	No		
54240	250	98/02/113-59	1	115	3	1	90	3.46	1.17	32.64	-13.58	No		
54241	250	98/02/113-59	1	115	3	2	91	-1.12	1.17	32.64	-13.58	No		
54242	250	98/02/113-59	1	115	3	3	92	6.01	1.17	32.64	-13.58	No		
54243	250	98/02/113-59	1	115	6	1	106	1.13	1.17	32.64	13.50	No		
54244	250	98/02/113-59	1	115	6	2	107	-0.11	1.17	32.64	-13.58	No		
54245	250	98/02/113-59	1	115	6	3	108	1.84	1.17	32.64	-13.58	No		
54246	250	98/02/113-59	1	115	6	4	109	-1.05	1.17	32.64	-13.58	No		
54247	250	98/02/113-59	1	115	6	5	110	4.73	1.17	32.64	-13.58	No		
54248	250	98/02/113-59	1	115	1	4	85	11.4	10.61	30.13	-6.22	No		
54249	250	98/02/113-59	1	115	4	6	99	10.96	10.61	30.13	-6.22	No		
54250	250	98/02/113-59	1	115	5	6	105	11.14	10.61	30.13	-6.22	No		
54251	250	98/02/113-59	1	115	6	6	111	8.64	10.61	30.13	-6.22	No		