

Investigation of the Environment for Conservation
in the Facilities of Exhibition and Collection for Cultural Properties

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ABSTRACT

The facilities of exhibition and collection for cultural properties is affected by environmental pollution. In order to accumulate a store of basic data, we was investigated eight points(three points at exhibition room and five points at collection room) at four institutes, from December 2000 to March 2001.

As a result of investigation, the temperature of A-Exhibition room measured low because of don't moved HVAC(Heating, Ventilation and Air-Conditioning) System, B-Exhibition room is dry for the effect of air-conditioner and the air pollutants concentration of C-Exhibition room is high for the kind of an exhibition room. The air-condition was varied within the open period.

The air pollutants concentration of A-Collection room is measured high because the air-pollutants is generated in a new buildings and the air pollutants concentration of C-1 & C-2-Collection room is high for the kind of an collection room. It is necessary to ventilate sufficiently.

*

1.

2000 12 2001 3 4 8 (3 , 5)

, 가
 , 가
 ,

24

2.

CO, CO₂, SO₂, HCHO, Total HC, H₂S, O₃, NO_x

Table 1

CASELLA ICS500 ()	, , , CO, CO ₂	1
INNOVA 1312, 1309 ()	SO ₂ , HCHO, Total HC, H ₂ S, O ₃	5
API 200A ()	NO _x (NO, NO ₂)	5

Table 1.

3.

4 , 8

, A, B, C, D

. A 가 , B
 , C , D
 , Table 2 .

Table 2

A	.	-	. () 가 .
B	.	.	. 가
C	.	. C-1: . C-2:	. C : 가 . C-1 : 가 24 가 . C-2 : 가 .
D	-	.	. 가

1. .

Table 3, Fig. 1, 2 ,

Table 4

가 A 10.4 , 37%, B 22.1 , 26%, C 18.7 , 31%
 . A 가 가
 , B · C
 Fig. 1(), 2() 가 (09:00 18:00)
 . 가 .
 . 가 가 A 가 16.3 ,
 47%, C-2 가 17.5 , 41% Table 4 .
 , 가 가 B 가 20.4 ,
 34%, D 가 22.4 , 32% 4 가 , Fig. 1(), 2()
 . 가 .

가 C-1 . 21.5 , 51%

		A	B	C	A	B	C-1	C-2	D
[]	max	10.4	21.8	18.8	16.3	20.4	21.5	17.5	22.4
	min	11.3	23.7	21.0	17.3	20.8	21.6	17.5	22.5
[%]	max	37	26	31	47	34	51	41	32
	min	39	28	35	48	37	51	42	34
	min	34	24	26	43	31	51	40	30

Table 3.

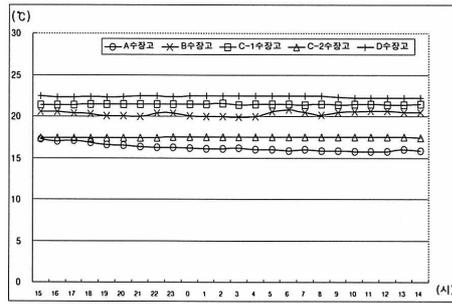
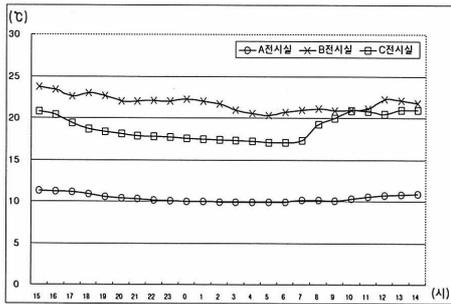


Fig 1

[] :
() . ()

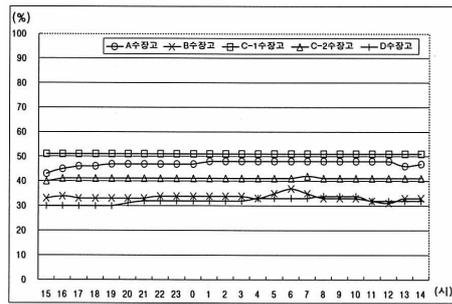
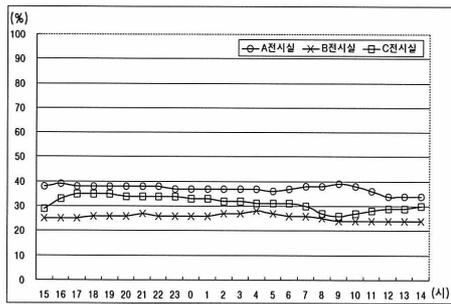


Fig 2

[%]:
() . ()

Table 4.

		()	(%)
UNESCO	, , , ,	16 24	40 63
	, 가 , ,	16 24	45 63
	, , , ,	16 24	50 63
	, , , ,	16 24	55 63
ICOM		15.5 23.5	55 60
		18 20	65
		-	50
ASHRAE Guide and Data Book		21.1 22.2	50 55
	가	4.4 10	50

- UNESCO : United Nations Educational, Scientific and Cultural Organization
- ICOM : International Council of Museum
- ASHRAE : American Society of Heating, Refrigeration and Air Conditioning Engineers

2.

Table 5, Fig. 3 가 A

0.03m/s, B · C 0.06m/s (定温) 0.3m/s

, Fig. 3() 가

A · B · C · 2 · D 가 0.02 0.05m/s

, Fig. 3() C-1 0.13m/s

가

가

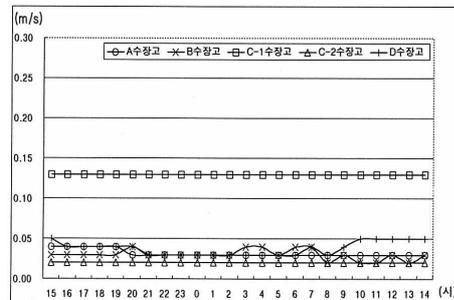
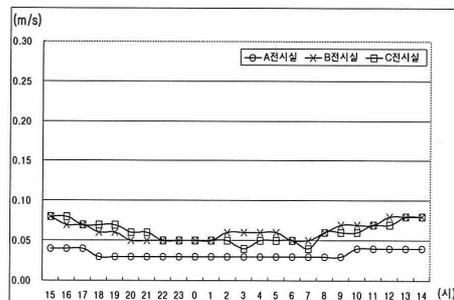
Table 5.

		A	B	C	A	B	C-1	C-2	D
		0.03	0.06	0.06	0.03	0.03	0.13	0.02	0.04
[m/s]	max	0.04	0.08	0.08	0.04	0.04	0.13	0.02	0.05
	min	0.03	0.05	0.04	0.03	0.02	0.13	0.02	0.03

Fig. 3

[m/s]:

() · ()



3.

Table 6

		CO ₂ , ,
		, ,
		, NH ₃ ,
		, , ,
		,
		, , , ,
		CO ₂ , CO, NO, NO ₂ , SO ₂ , CxHy, ,
		NH ₃ , O ₃ ,
		HCHO, Asbestos,
		, ,
		, , , , , , ,
		, , , , , , ,

Table 6.

: , , , 1997, pp160

1) CO₂

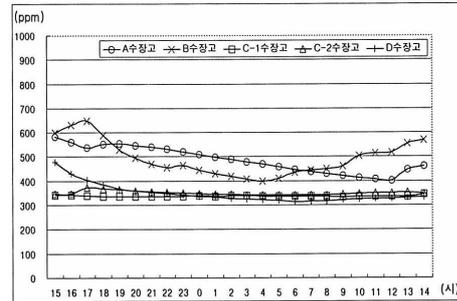
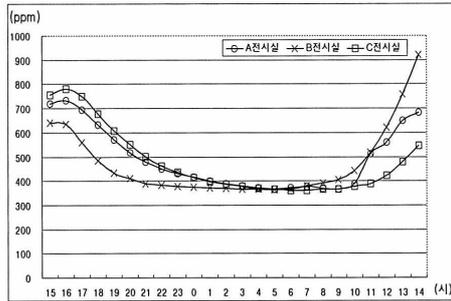
CO₂ Table 7, Fig. 4 . CO₂
 가 A 493ppm, B 473ppm, C 469ppm
 1000ppm/hr . Fig. 4()
 , B 921ppm .
 1000ppm ,
 .
 CO₂ C-1 338ppm, C-2 351ppm, D
 348ppm . Fig. 4()
 B 4
 . A
 , CO₂ 가 488ppm
 CO₂ .

Table 7.
CO₂

		A	B	C	A	B	C-1	C-2	D
CO ₂ [ppm]		493	473	480	488	494	338	351	348
	max	735	921	781	583	648	346	374	478
	min	366	365	361	402	400	335	343	315

Fig. 4

CO₂ [ppm]:
() · ()



2) CO

가 A 1.2ppm, B 1.1ppm, C 1.2ppm, D 1.0ppm
) , Fig. 5()
0.8 1.4ppm
CO A 2.0ppm, B 1.6ppm, C-1
1.5ppm, C-2 1.5ppm, D 1.2ppm , Fig. 5()
A 가
가
CO

Table 8.
CO

		A	B	C	A	B	C-1	C-2	D
CO [ppm]		1.2	1.1	1.2	2.0	1.6	1.5	1.5	1.2
	max	1.3	1.3	1.4	2.0	1.9	1.6	1.6	1.3
	min	1.0	0.8	1.1	1.9	1.4	1.4	1.4	1.0

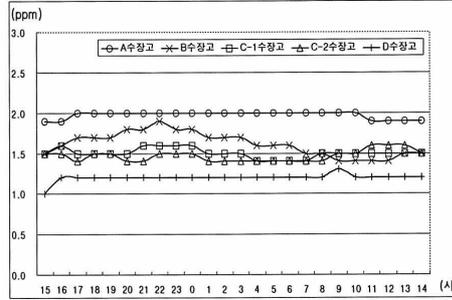
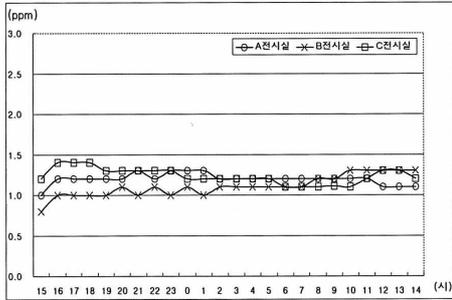


Fig. 5

CO [ppm]:
() · ()

3) SO₂

SO₂ Table 9, Fig. 6 SO₂
 가 A 0.003ppm, B 0.010ppm, C 0.005ppm B
 SO₂ B 0.008ppm, D 0.005ppm
 , A 0.029ppm, C-1 0.068ppm, C-2
 0.049ppm 0.25ppm/hr

		A			B				
		A	B	C	A	B	C-1	C-2	D
SO ₂ [ppm]		0.003	0.010	0.005	0.029	0.008	0.068	0.049	0.005
	max	0.005	0.014	0.006	0.031	0.010	0.071	0.056	0.006
	min	0.002	0.008	0.004	0.025	0.007	0.065	0.045	0.003

Table 9.

SO₂

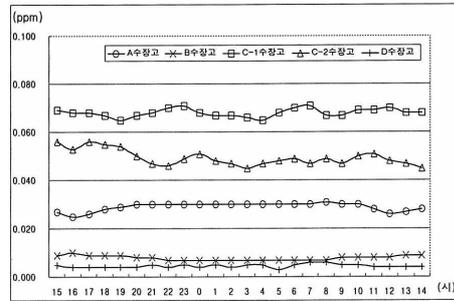
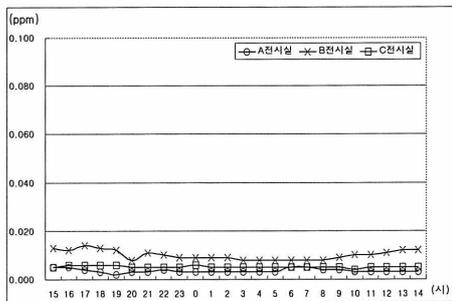


Fig. 6

SO₂ [ppm]:
() · ()

4) HCHO

HCHO Table 10, Fig. 7

HCHO A 0.01ppm, B 0.01ppm, C 0.02ppm

0.1ppm/day

HCHO A

가 0.08ppm 가 , C-1 C-2

0.06ppm , D

0.04ppm B

HCHO

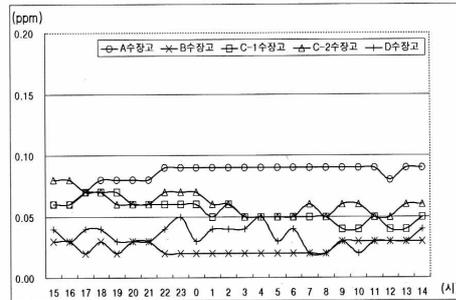
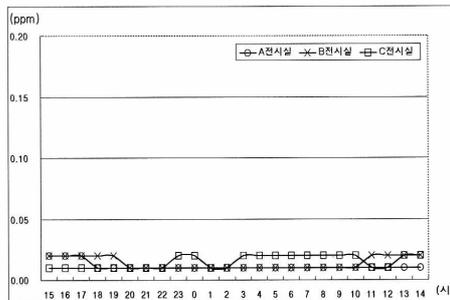
HCHO

Table 10.
HCHO

		A	B	C	A	B	C-1	C-2	D
HCHO [ppm]		0.01	0.01	0.02	0.08	0.02	0.05	0.06	0.04
	max	0.02	0.02	0.02	0.09	0.03	0.07	0.08	0.04
	min	0.01	0.01	0.01	0.06	0.02	0.04	0.05	0.03

Fig. 7

HCHO [ppm]:
() · ()



5) Total HC

Total HC Table 11, Fig. 8

Total HC A 2.3ppm, B 2.7ppm, C 3.5ppm

1.5ppm

Total HC 가 A 10.3ppm 가
 , C-1 C-2
 4.3ppm 7.8ppm . D
 4.0ppm
 , B 2.0ppm .

		A	B	C	A	B	C-1	C-2	D
Total HC [ppm]		2.3	2.7	3.5	10.3	2.0	4.3	7.8	4.0
	max	2.6	3.2	4.0	10.9	2.3	4.7	8.7	4.2
	min	2.2	2.4	3.3	9.5	1.8	4.0	7.2	3.6

Table 11.

Total HC

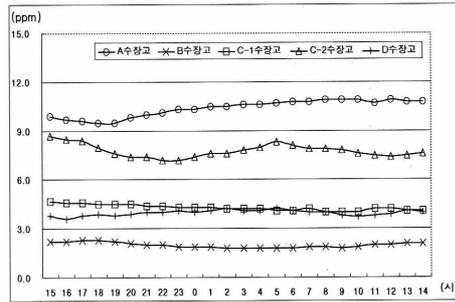
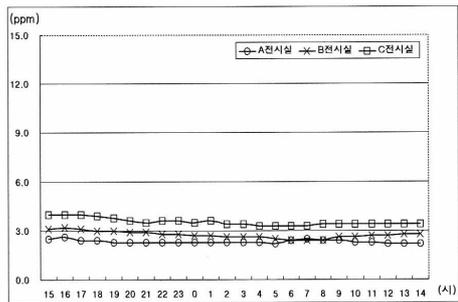


Fig. 8

Total HC [ppm]:
 () . ()

6) NO₂

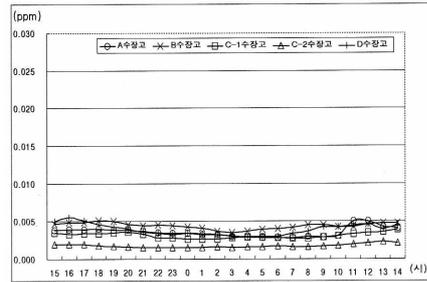
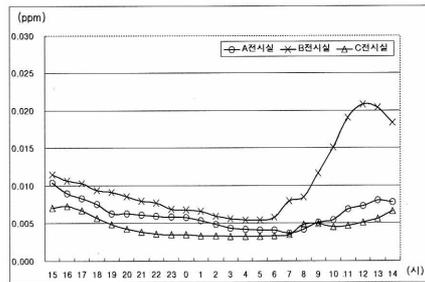
NO₂ Table 12, Fig. 9 . NO₂ 가 A
 0.006ppm, B 0.010ppm, C 0.005ppm ,
 9() B
 NO₂ A 0.004ppm, B 0.005ppm, C-1
 0.003ppm, C-2 0.002ppm, D 0.004ppm
 NO₂ 가 0.002 0.006ppm . NO₂
 가 .

Table 12
NO₂

		A	B	C	A	B	C-1	C-2	D
NO ₂ [ppm]		0.006	0.010	0.005	0.004	0.005	0.003	0.002	0.004
	max	0.010	0.021	0.007	0.005	0.005	0.004	0.002	0.006
	min	0.004	0.006	0.003	0.003	0.004	0.003	0.002	0.003

Fig. 9

NO₂ [ppm]:
() · ()



7) O₃, H₂S

(2000 12 2001 3 4 8
3 , 5)

1. .

가 ,
09:00 18:00 . 가 ,
가 C-1 가 21.5 , 51% ,

Table 4

2.

0.02 0.13m/s (定温) 0.3m/s

3.

1) CO₂()

(360 400ppm)

921ppm

A

, B

가

0.1%(1000ppm)

2) CO()

0.8 2.0ppm

가

1.0ppm

가

3) SO₂()

가

A

0.031ppm

C-1 · C-2

0.045 0.071ppm

7) O3()

8) H2S ()

26 , 22 , 20 22 , 20 ,
40 55% ,
가 0.3m/s
가
가
가
가

1. , , , 1994
 2. , , , 1997
 3. , , , 1999
 4. (), ,
1996
 5. , , 1999
 6. , ,
11 12 86 , 1995
 7. , ,
, 1999
 8. , ,
, 1999
 9. , , 22
4 , 1996
 10. Garry Thomson, The Museum Environment, Butterworth, 1981
 11. ,
 12. , BU
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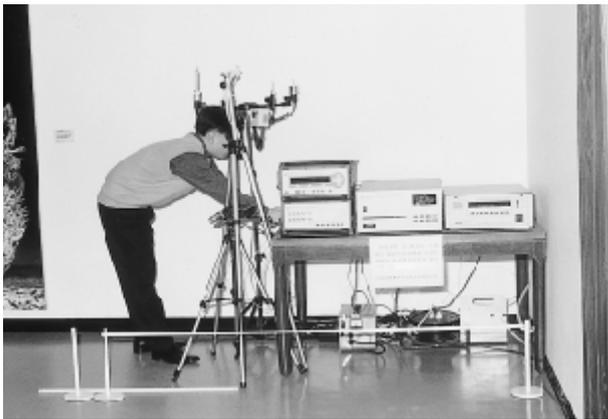


Photo 1.

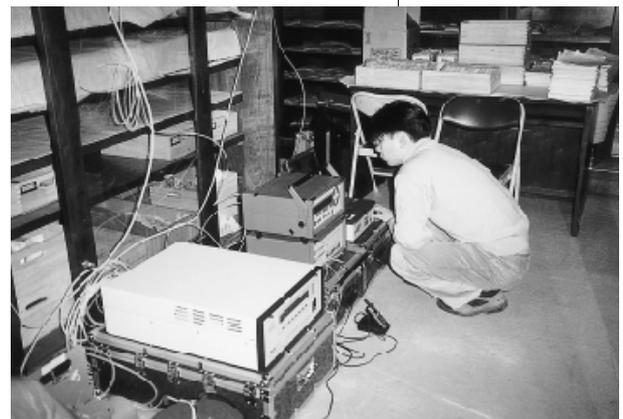


Photo 2.