## Table 5-1 REQUIRED ANALYZERS INSTRUMENTS AND EQUIPMENT

	CODE No. Item (Equipment Name)	Note
1	Ambient CO Monitor	Range : 0~10/20/50/100 ppm
2	Ambient SO2 Nonitor	Range : 0~0.1/0.2/0.5/1.0 ppm
3	Ambient NOx Monitor	Range : 0 ~0. 1/0. 2/0. 5/1. 0 ppm
4	Ambient O3 Monitor	Range : 0~0.1/0.2/0.5/1.0 ppm
5	Ambient HC (Hydrocarbons) Monitor	Range : 0~5/10/20/50 ppmC
6	Ambient SPM Monitor	Range : 0 ~0.25/0.5/1/5 mg/cm3
7	Meteorological Observation Instrument	Wind Vane & Anemometer, Thermometer, Hygrometer Pyrheliometer, Net Exchange Radiometer
8	System Rack for Monitor	
9	Ambient HF (Hydrogen Fluoride) Monitor	
10	High Volume Air Sampler	
11	Low Volume Air Sampler	
12	Stand Sampler	
13	Automatic Water Still	
14	Electric Drying Oven	
15	Electric Balance	200g/0.1mg, 3,200g/10mg, 430g/1mg
16	Spectro Photometer	
17	Chemical Analysis Glass Ware	
18	Personal Computer (486PC)	Desktop Computer, Laptop computer,
19	Nulti Pen Recorder	Lazer Type Printer
20	Atomospheric Sampling Pipeline	
21	Span Gas Cylinder Set	· · · · · · · · · · · · · · · · · · ·
22	Standard Gas Generation Apparatus	

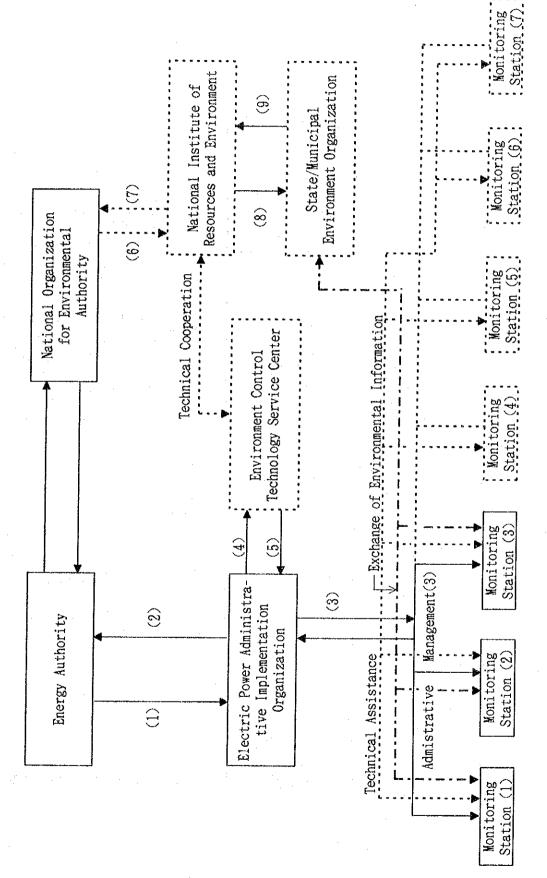
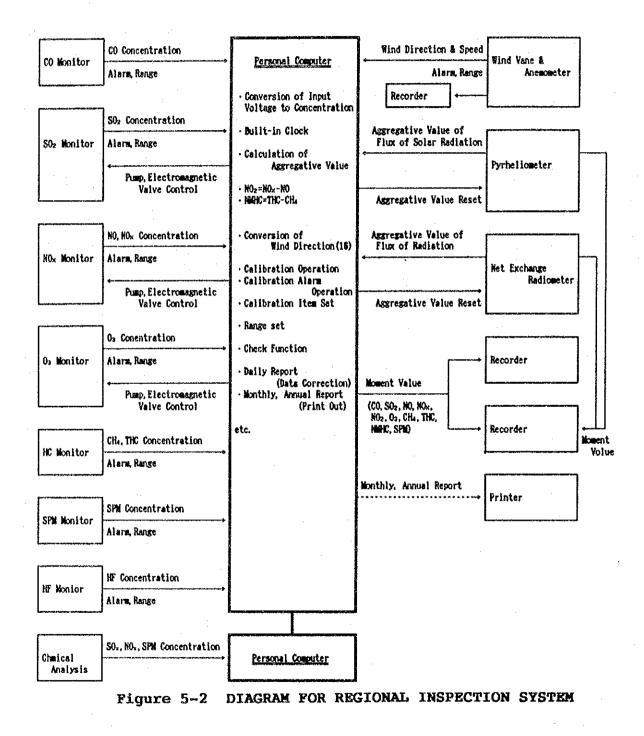
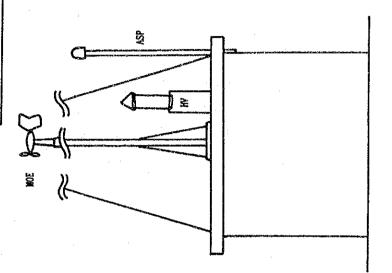


Figure 5-1 ESTABLISHMENT OF MONITORING STATION FOR THERMAL POWER PLANTS IN ARGENTINE REPUBLIC (PROPOSAL)



#### 5 ~ 8

Legend of Instruments and Equipments 200 : Mabient CO Nonitor NOX 2 Mabient RN Monitor NOX 2 Mabient RN Monitor NOX 2 Mabient RN Monitor 201 : Mon



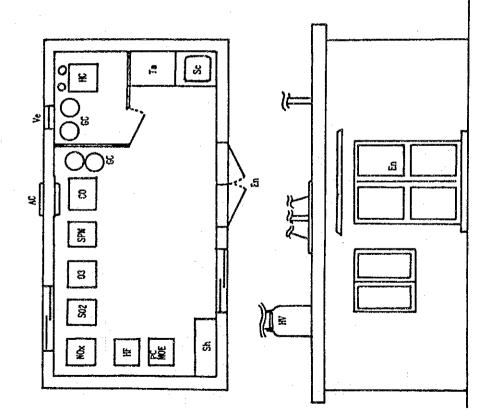


Figure 5-3 LAYOUT PLAN FOR INSPECTION STATION

5' - 9

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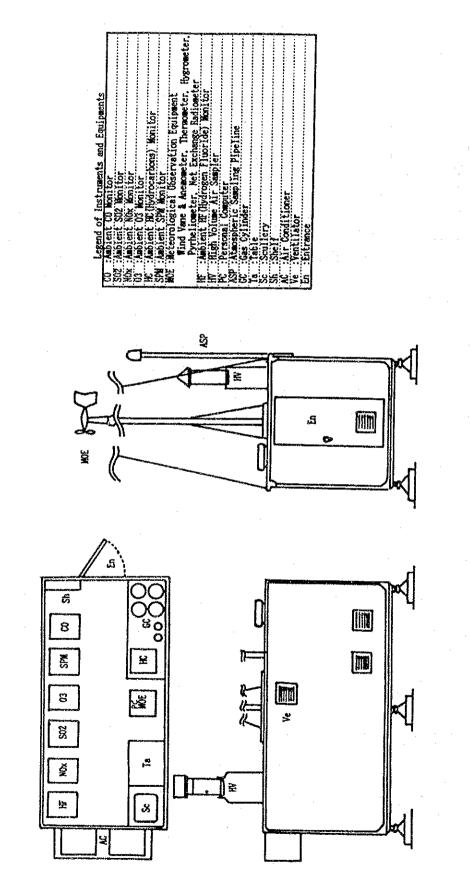


Figure 5-4 LAYOUT PLAN FOR INSPECTION STATION (ALTERNATIVE)

a an	<u>(Unit</u>	<u>; 1,000_US</u>
Code No.	Item	Total
1	Base Cost	
1-1	Equipment Cost	
1-1-1	Anayzer	1, 00
1-1-2	Inland Transportation	1
1-1-3	Installation	3
	Sub-Total	1, 05
1-2	Civil Works	
1-2-1	Construction Work	10
1	Sub-Total	10
1-3	Maintenance	13
1-4	Pre-Operational Costs	1
	Total of equipment component (per 1 station)	1, 30
1-5	Staff Development	
1-5-1	Domestic Training	10
1-5-2	Overseas Training	45
1-5-3	Invitation of Foreign Exports	40
	Sub-'Total	95
1-6	Consultant Services	
1-6-1	Design and Supervision of Civil Engineering Works	10
1-6-2	Oversea Engineering Service Consultant	50
	Sub-Total	60
1-7	Taxes and Duties	
	Total	4, 16

# Table 5-2(1) SUNMARY OF PROJECT COST

Total project cost for three stations

1) Station cost :	3 x 1,307	Ξ	US\$3, 921	
2) Other cost (1-5	- 1-6)	=	US\$1, 551	
Total			US\$5, 471	

	Table	5-2(2)	BREAK	DOWN	FOR	ANALYSER
•						

No.	Item	Quantity	Unit Price (US\$)
1	Equipment Cost		
1-1	Ambient CO Monitor	1	25, 600
1-2	Ambient SO2 Monitor	1	40, 850
1-3	Ambient NOx Monitor	1	48, 570
1-4	Ambient 03 Monitor	1	39, 090
1-5	Ambient HC (Hydrocarbons) Monitor	1	39, 020
1-6	Ambient SPM Monitor	1	37, 450
1-7	Metcorological Observation Equipment	1	50, 580
1-8	System Rack for Monitor		93, 230
1-9	Telemeter		
1-10	Ambient HF (Hydrogen Fluoride) Monitor	1	323, 800
1-11	High Volume Air Sampler	1	5, 940
1-12	Low Volume Air Sampler		4, 840
1-13	Stand Sampler		1, 820
1-14	Automatic Water Still	1	11, 650
1-15	Electric Drying Oven	1	2, 620
1-16	Electric Balance (200g/0. 1mg)	1	5, 550
· · · · · · · · · · · · · · · · · · ·	Electric Balance (3,200g/10mg)	1	2, 310
·····	Electric Balance (430g/1mg)	1	3, 170
1-17	Spectro Photometer	1	6,000
1-18	Chemical Analysis Glass Ware	1	2, 540
1-19	Personal Computer (486PC)	2	20, 560
	Desktop Computer		
	Laptop Computer		
	Lazer Type Printer		<i>x</i>
1-20	Multi Pen Recorder	2	25, 640
2	Spare Parts & Consumables for 2 Years	1	28, 120
3	Ocean Freight	1	11, 900
4	Export Packing	1	8,090
		-	

	CMT		RIS		DOTO	0.1
	SMI	RIS1	RIS2	RIS3	FGIC	Subtotal
1. Project Director	r 2					2
2. Project Manager	2	1	1	1	1	6
3. Chemical Resarch	her				1	1
4. Environmental En	ngineer	1	1	1	1	4
5. Chemical Analyst	t l	1	1	1	1	4
6. Chemical Technic	cian	1	1	1	1	4
7. Mechanical Engin	neer	1			1	2
8. Process Engineer	r	1			1	2
9. Instrumentation Technician		1			1	2
10. Project Engineer	r 1				1	2
11. Programmer	1	1	1	1	1	5
12. Officer	1	1			1.	3
13. Clerk		1	1	1	1	4
TOTAL	7	10	6	6	12	41

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#### Table 5-3 SCHEDULE FOR MAN-POWER ASSIGNMENT FOR THE PROJECT

Table 5-4 SPECIFICATION OF AUTOMATIC ANALYZER OZONE BY ULTRAVIOLET ABSORPTION METHOD

840 Ultraviolet d absorption method	El C Sug	max. ±2 %FS max. ±1 ppb/day max. ±2 %FS/day max. ±2 %FS max. ±1 %FS/	$100 V \pm 10 V$ max. 10 sec. (90%) 1 ppb Three figures of dicinals point 0~1VDC	Teflon \$\$4.75 (\$6.3)	Teflon \$\$4.75 (\$\$6.3)	Teflon Ø47 Marce flyw motor	0.51/min. 0.51/min.	71/min. 1.51/min.			H) $500 \text{ (b)} \times 486 \text{ (w)} \times 220 \text{ (H)}$	approx. 20kg
GUX-32 Ultraviolet absorption method			100 V $\pm$ 10 V max.2 min. (90%) 1 ppb Three figures of dicimals point 0~1VDC	Teflon ¢6 (¢8)	Teflon ¢4 (¢6)	Teflon Ø55 drass flom motor	0.11/min.	51/¤in. 21/¤in.		面前,40面面 0~40℃ AC100±10%	30/ 00112 0011 USC approx. 150VA )550(D) ×430(y) ×220(	approx. 30kg
MODEL-49 Ultraviolet absorption method	2	-	$100 V \pm 10 V$ max.20 sec. (90%) 2 ppm Three figures of dicinals point 0~10mV.0~1VDC	Teflon φ4 (φ6), φ6 (φ8),	1/4 Teflon 1/4	Teflon \$47 or \$40 Aros flow mater	0.11/min.	61/min. 21/min.	- -	min.30min 0~50°C AC100±10%	approx.150VA 590(D)×480(W)×220(H)	approx. 16kg
1005-AHJ Ultraviolet absorption method	Instantaneous value 0~1.0 ppm Mono-range	1000 -	100 V ± 10 V max.36 sec.(90%) 0.01 ррш Three figures of dicimals point 0~1YDC	Teflon ¢4 (¢6)	Vinylone \$\$ (\$8)	Teflon Ø47 Åres flow meter	0.21/min.	41/nin. 21/nin.		min.30min 0~40°C AC100±10%	approx. 75VA 560(D) ×440(W) ×140(H)	approx. 10kg
APUA-35UE Ultraviolet absorption method	Instantancous value 0~0.1/0.2/0.5/1.0ppm Manual change Selection by external signal	A .	$100 V \pm 10 V$ max.2 min.(90%) 2 ppb Four figures of dicimals point 0~1V.0~10VDC 4.~20mAYC	lefion ¢6 (¢8)	Teflon ¢4 (¢6)	Teflon φ54 Åres flow meter	0∼31/¤in. 0.21/¤in.	51/min. 21/min.		ain. 120min ain. 30min ain. 30min ain. 40min 0~40°C 0~40°C 0~50°C 0~60°C 0~40°C AC100/115/220V AC100±10% AC100±10% AC100±10% 50/60H3 to be desired ar(60H5 both use 60 0.5 60H5 60/60H5 both use 60 0.5 60H5	approx. 180VA 550(D) ×430(W) ×221(H)	approx. 20kg
Acasurement priciple	Measuring range and change of range manual or automatic	<ol> <li>Repeatability</li> <li>Drift a. zero</li> <li>Linearlity</li> <li>Variation of voltage</li> </ol>	<ul> <li>6. Response time</li> <li>7. Detection limit</li> <li>8. Resolution</li> <li>9. Outputs</li> </ul>	· sample	inner piping tube a. material b. inner diameter	(outer diameter) a. material b. size(φ) ter a kind	b. scale c. min. scale of samiing flow rate	din t	D. Scale c. min. scale of sampling flow rate	Warming-up time Ambient temperature Power source	Consumption of electric power Outer size a. main	Weight a. main b. pump
Item	Performancel.	રાંજ સંખે	യറ്യ് ത്		14	<u> </u>	<u>i</u>	<u>-1 'o' ù'</u>		0thers 0.1.	4.10	<u>. 0</u>

		) 				
Iype	DRM-200E(S)	DRM-200K	US-750	02752	AR-1025NA	Riamarice
Construction						
Water receiving trap diameter 200mm	200mm		200mm	20030	300mm	
Diameter of falling dry	200mm	200mm			280mm	
matters receiver	:					0
Rain detector	ca. hum & precipitation	<pre>precipitation</pre>	ca.0.5mm & precipitation ca.0.5mm & precipitation		None requirement	- <b></b>
* .			detector			
	al heater	Internal heater	Internal heater	Internal heater	Internal heater	
Resolution of rain	0.5mm				0. Sturn	
Tank for storage sample	Yes	rage unit		storage unit		~~~~
Measuring Item and Method						
Precipitation	Reversing bottle by 0.5m	Reversing bottle by 0.5mmReversing bottle by 0.5mm Reversing bottle by 0.5mm Reversing hottle by 0.5mm	Reversing buttle by 0 5mm	eversing bottle by 0 5mm	Reversing hottle har 0 from	
		with additional rain cange		ith additional wein converte	with additional wate merediate odditional and	
Hď	Glass electrode		Glass electrode	Gise alastroda Gise alastroda	eru autruiai ram gauge	•
	Temperature compensation	Temperature comensation	anti an		Alass electrone	•••••
Conductivity (EC)	Twin electrode diode	Twin electrode dinde	Twin electrode diode		Temperature compensation	
	25°C NaCl base				25°C NaCi base	
Temperature of rain water	Platinum resistance	ance	ance	Juce	Platimum resistance	
S04(2-)					Furbidimetric hv Rof12	aronir 1mm moin foit
(-)SON		I	1	1	[[[traviolet spectronhotometro]	for 9 movemented
					(temperature comparentica)	For ME 2 DO
Measuring Range and Precision					And a car a company of the	/101 N 11/ 101
PH PH	$0-10\pm0.1$ pH	0-10+0.10	0+10+0 Inff			
Conductivity						
•		ES + 3%				
I Temperature of rain water	50					-
SOL(2-)	1				0-40十0.570	
(-) EON	1	1 1	F T	1 1	0-20 µg/m], FS±5%	
Others						
Washing method of receiver	Automatic washing	Automatic washing	Automatic washing	Automatic washing	Artomatic washing	
Warming-up time	30min				standard, Shee	
	Timer set for 1,2,3,4hrs				standate we will a	
Range for temperature	pH EC: 0-40°C	pH. EC: 0-40°C				
compensation			<b>b</b>			
winterization	by limit switch (max.7C)by	by limit switch (max. 7C)	oy limit switch (max.5°C)	y limit switch (max.5°C)	ov temp. limit switch	
Cooling fam	by limit switch	by limit switch	by limit switch	limit switch by limit switch by limit switch by temp. limit switch	by temp. limit switch	
			(including for dissoloing(including for dissoloing	including for dissoloing		-
			of snow)	of snow)		

Table 5-5 SPECIFICATION OF AUTOMATIC ANALYZER FOR ACID RAIN

#### Table 5-6 SPECIFICATION OF AUTOMATIC ANALYZER BY PIEZO ELECTRIC BALANCE METHOD AND LIGHT SCATTERING METHOD

Certorance Beasuring range and selection         D-Smg/m2 (2min measurement)         ID-10.0000PH 0.01-10mg/m2           Resolution Repeatability transmitty         1.42/63         1.42/63           Repeatability transmitty         1.42/63         1.42/63           Bink test (2kin)         max. ± 23 (2kin)         max. ± 24 (2kin)           Bink test (2kin)         max. ± 10% or max. ± 10/42/183         max. ± 23 (2kin)           Bink test (2kin)         max. ± 10% or max. ± 10/42/183         max. ± 23 (2kin)           Stability of Thor rate or ambient air Aubient air sampling pipe a. external piping         max. ± 10% or max. ± 10/42/m3         max. ± 10%           Bink test (2kin)         max. ± 14/470         max. ± 10%         max. ± 10%           Stability of Thor rate or ambient air Aubient air sampling pipe a. external piping         polythron polythylene 6, 35m         max. ± 10%           Bink test (2kin)         max test (2kin)         max. ± 10/42/min         mone voltage contact outlet sin sappling           Flow rate or sampling         polythron side 251/min appliction side 251/min sappling time (10 mate)         Sam         chlorinated vinyl 10m           Flow rate or sampling time in presention concentration         more         more         chlorinated vinyl 10m           Flow rate or sampling time in presention concentration         more         more         chlorinated vinyl 10m </th <th>Measurement principle Item System</th> <th>Piezoelectric Balance Method SYSTEM3611</th> <th>Light Scattering Method AP635</th>	Measurement principle Item System	Piezoelectric Balance Method SYSTEM3611	Light Scattering Method AP635
0-0.4sg/s3 (30sin average)     0.01-long/s3       Repeatability (triple)     1#k/s3       Diff (24br)     axx ±23       Diff (24br)     axx ±23       Disspan (tuil scale)     axx ±23 (24br)       Disspan (tuil scale)     axx ±23 (24br)       Diant (cst (24br)     axx ±23 (24br)       Diant (cst (24br)     axx ±10% or eax. ±10 µ µ/m3       a. for calibration particle     axx ±10% or eax. ±10 µ µ/m3       b. for parcicle suspended in attacosphere max. ±23% or max. ±10 µ µ/m3     axx. ±12%       Stability of the rate of ambient atr     max. ±15% day       Stability of the rate of ambient atr     max. ±15% day       a. external piping     polyfuron       b. internal piping     polyfuron       b. internal piping     polyfuron       for wrate of sampling     apiration side       genal volecity aspiration side     apiration side       Plow rate of sampling     scaternal piping       Flow rate of sampling     scaternal piping       Pressure difference allowable     scaternal piping       Sampling time (total sampling time in repeat measureant)     mone       Prost rate stabilyzer     scaternal piping       Flow rate of sampling     scaternal piping       Collection antide     scaternal       Prost rate stabilyzer     scaternal       Frest off	erformance	0 = 1 = 2 = 10	10 10 000000
Repeatability (triple)       max. ±2%         Diff (2dhr)       max. ±2% (2dhr)         a. zero (full scale)       max. ±2% (2dhr)         Blank test (2dhr)       max. ±10/max. ±2% (2dhr)         Linearity       max. ±10/max. ±1	Measuring range and selection	U-5mg/m3 (Zmin measurement)	10-10, 000CPM
Repeatability (triple)       max.±23         Diff (2Mir)       max.±23 (2Mnr)         Linearity       max.±23 (2Mnr)         Blank test (2Mnr)       max.±23 (2Mnr)         Linearity       max.±23 (2Mnr)         a. for calibration particle       max.±10% or max.±10µg/m3         b. for parcicle suspended in atmosphere       max.±23 (2Mar)         satistic statistic stat	······································	U-U.4mg/m3 (30min average)	0.01-10mg/m3
Driff (22hr) a. zero (hull scale) b. span (hull scale) Blank test (22hr) Linearity a. for calibration particle b. for particle suspended in atcosphere b. span (full scale) Blank test (22hr) Linearity a. for calibration particle b. for particle suspended in atcosphere b. internal piping b. internal piping b. internal piping b. internal piping c. caltornal piping b. internal piping c. caltornal piping b. internal piping c. caltornal piping c. caltornal piping c. caltornal piping polyturon detection side 21/ain flow mate of sampling Flow mate of sampling Flow mate of sampling Flow rate stabilyzer Flow frate stabilyzer Flow frate stabilyzer Flow frate stabilyzer Flow indec Flow frate stabilyzer Flow indec Flow frate stabilyzer Flow frate	Kesolution	1μg/m3	1 μg/m3
a. zero (full scale) b. span (full scale) Blank test (24hr) ax. ±23 (24hr) ax. ±10% b. for parcicle suspended in atasophic there is any ling of power source (±10%) ax. ±10% asx. ±10 µg/s2 mone voltage contact outlet sin and ing ablicit ar sampling ip: a. axternal piping b. internal piping can axternal piping b. internal piping b. internal piping can axternal piping b. internal piping can axternal piping b. internal piping can axternal piping b. internal piping can axternal piping can axternal piping b. internal piping can axternal pip	Repeatability (triple)	]	max. ±2%
b. span (full scale) max, ±2% (24br) Linearity a. for calibration particle max, ±10% or max, ±10 µg/m3 max, ±20% or max, ±10µg/m3 max, ±10% max,			
Blank test (2Mir)       nax, ±10% or max, ±10 $\mu$ g/m3       max, ±10%         incertify       max, ±10% or max, ±10 $\mu$ g/m3       max, ±10%         h for parcicle superded in ateosphere       max, ±10 $\mu$ g/m3       max, ±10%         Stability of flow rate of abient air       max, ±10 $\mu$ g/m3       max, ±10%         Ambient air sampling pipe       max, ±10       max, ±10         a. external piping       polyfuron       gam         b. internal piping       polyfuron       gam         flow mate of sampling       aspiration side       SOl/ain         Equal velocity aspiration side       sapiration side 221/min       SOl/ain         Flow mater       sapiration side 221/min       Soliain         repeated measurement)       repeated measurement)       repastandard Sy3A         repe	a. zero (full scale)	1	max, ±2% (24hr)
Linearity a. for calibration particle h. for particle suspended in atmosphere hax. ±10% or max. ±10 µg/m3 max. ±10% max. ±20% or max. ±10 µg/m3 max. ±10% max. ±20% or max. ±10µg/m3 max. ±10% max. ±20% or max. ±10µg/m3 max. ±10% max. ±10	b. span (full scale)		max, ±2% (24hr)
a. for calibration particle hax $\pm 10\%$ or max $\pm 10\mu \mu/m3$ max $\pm 20\%$ max $\pm 10\%$ max $\pm 20\%$ max $\pm 1\%$ more voltage contact outlet signapling max details ampling pipe a. external piping polyturon 9mm colyethylene 6.35mm bard chlorinated vinyl 18mm polyethylene 6.35mm bard chlorinated vinyl 18mm for valcof sampling max $\pm 20\%$ max $\pm 1\%$ more voltage contact outlet signapling max $\pm 20\%$ max $\pm 1\%$ more voltage contact outlet signapling max $\pm 20\%$ max $\pm 1\%$ more voltage contact outlet signapling max $\pm 20\%$ max $\pm 1\%$ more voltage contact outlet signapling max $\pm 20\%$ max $\pm 1\%$ more voltage contact outlet signapling the external piping application side 201/min 350/min detection side 11/min for mate stabilyzer $3.3 \pm 21\%$ more to $3.3 \pm 21\%$ more $3.3 \pm 21\%$ more $50\%$ max $\pm 10\%$ more $50\%$ mo			
b. for parcicle suspended in atmosphere max. ±20% or max. ±10/mg/m3 max. ±20% Stability of flow rate of ambient in max. ±50% day max. ±20% Fluctuation of power source (±10%) max. ±1 µ g/m3 max. ±5% day mone voltage contact outlet signapping ampling molyethytene 6.35mm hard chlorinated vinyl 18mm b. internal piping polyethytene 6.35mm hard chlorinated vinyl 18mm flow rate of sampling molyethytene 6.35mm hard chlorinated vinyl 18mm flow rate of sampling molyethytene 6.35mm hard chlorinated vinyl 18mm flow rate of sampling molyethytene 6.35mm hard chlorinated vinyl 18mm flow rate of sampling molyethytene 6.35mm hard chlorinated vinyl 18mm flow rate of sampling molyethytene 6.35mm hard chlorinated vinyl 18mm flow rate of sampling molyethytene 6.35mm hard chlorinated vinyl 18mm flow rate of sampling molyethytene 6.35mm hard chlorinated vinyl 18mm flow rate stabilyzor moly moly moly moly moly moly moly moly			
Stability of flow rate of ambient air       inax. ± 1x g/m3       max. ± 1x g/m3         Output of telemeter       DC 0-1Y       max. ± 1x g/m3       max. ± 1x g/m3         ampling       Ablent air sampling pipe       none voltage contact outlet signaling in g       polyturon       9mm         a. external piping       polyturon       9mm       chlorinated vinyl       18mm         Equal velocity aspiration side       aspiration side 251/min       5501/min       5501/min         Flow mate of sampling       aspiration side 201/min       551/min       5501/min         Flow mate of sampling       aspiration side 201/min       551/min       5501/min         Flow mate calls appling       aspiration side 201/min       551/min       5501/min         Flow mate calls appling       sampling time (total sampling time (total sampling time in repeat measurement)       none       -         Prossure difference allowable       samic x 2       50min       -         Sampling time (total sampling time in repeat measurement)       min 95% (max. 10 µ particle)       -       -         For ing concentration system       ingestor x 2       -       -       -       -         Collecting method       becore x 2       -       -       -       -       -       -         For in	a. for calibration particle	$\max_{\pm} \pm 10\%$ or $\max_{\pm} \pm 10 \mu$ g/m <sup>3</sup>	max. ±10%
Fluctuation of power source (±10%)       pax.±12g/m3       pax.±12       pax.±1	b. for parcicle suspended in atmosphere	max. $\pm 20\%$ or max. $\pm 10 \mu$ g/m <sup>3</sup>	max. ±20%
Fluctuation of power source (±10%)       pax.±12g/m3       pax.±12       pax.±1	Stability of flow rate of ambient air	max. ±5%/day	max. ±5%/day
Onliput of telemeter         DC 0-1V         nome voltage contact outlet signaphing           Ambient air sampling pipe         a. external piping         polyfuron         9mm           b. internal piping         polyethylene         6.35mm         hard chlorinated vinyl         18mm           Equal velocity aspiration side         aspiration side         251/min         550//min         550//min           Flow mater         sapiration side         21/min         550//min         550//min           Flow mater         surface flow mater         none         550//min           Flow mater         surface flow mater         none         500//min           Flow mater         surface flow mater         none	Fluctuation of power source $(\pm 10\%)$	$\max_{\pm} \pm 1 \mu g/m^3$	$\max \pm 1\%$
ampling       polyfuron       9mm       chlorinated vinyl       18mm         Ambient air sampling pipe       a. external piping       polyethylene       6. Semm       chlorinated vinyl       18mm         Equal velocity aspiration side       aspiration side       251/min       550/min       550/min         Flow rate of sampling       aspiration side       221/min       550/min       550/min         Flow rate of sampling       aspiration side       221/min       351/sin       351/sin         Flow rate stabilyzer       sonic-nozzle       none       -       -         From suprace the aspiration side collection       none       -       -       -         From suprace stabilyzer       sonic-nozzle       none       -       -       -         From suprace and sampling time in       22sin x 2       50min       -	Output of telemeter	DC 0-1V	
Ambient air sampling pipe       polyfuron       9mm       chlorinated vinyl       18mm         Equal velocity aspiration side       aspiration side       2501/min       5501/min         Equal velocity aspiration side       aspiration side       21/min       5501/min         Flow rate of sampling       aspiration side       21/min       31/min         Flow rate stabilyzer       surface flow meter       none	ampling		
a. external piping polyfuron 9mm chlorinated vinyl 18mm b. internal piping polytupylene 6.35mm chlorinated vinyl 16mm S507/sin Flow rate of sampling aspiration side 251/min detection side 201/min 351/min flow rate of sampling aspiration side 201/min 351/min flow rate stabilyzer flow rate stabilyzer for high concentration repeat measurement from a concentration repeat measurement from surface flow meter source a lowable for life paper collection area etection unit betector as type b. detector life a. type b. detector life a. type b. detector life a. type b. detector fig. 2-6-13 fig. 2-6-13 fig. 2-6-13 fig. 2-6-13 fig. 2-6-13 fig. 2-6-13 fig. 2-6-13 fig. 2-6-14 fig. 2-6-13 fig. 2-6-14 fig. 2-6-14 fig. 2-6-14 fig. 2-6-13 fig. 2-6-14 fig. 2-6-1	Ambient air samoling pipe		
b. internal piping polyethylene 6.35mm hard chlorinated vinyl 16mm Equal velocity aspiration side aspiration side 251/min 5507/min detection side 201/min 351/min 351/min Flow rate of sampling aspiration side 201/min 351/min aspiration side 201/min 351/min for meter 3.2-321/min none for high concentration repeat measurement		polyfuron 9mm	chlorinated vinvl 18mm
Equal velocity aspiration side       aspiration side       2501/min       5501/min         Flow rate of sampling       aspiration side       211/min       351/sin         Flow meter       surface flow meter       none         Flow meter       surface flow meter       none         Flow meter       surface flow meter       none         For high concentration       repeat measurement       -         For super sup			hard chlorinated vinyl 16mm
Flow rate of sampling       detection side 201/min aspiration side 201/min detection side 11/min       351/min 351/min         Flow meter       3.2.321/min surface flow meter       none         Tow rate stabilyzer       sonic-nozzle       none         For high concentration       repeat measurement       -         Fressure difference allowable       -       -         Sampling time (total sampling time in repeated measurement)       -       -         Particle separation system       inpactor       none         Collection area       -       -         Form of collection area       -       -         Collector area       -       -         b. half life       -       -         Detector a. type b. detector life       -       -         b. half life       -       -         Detector unit       -       -         warming-up time       2 min       -         Wetehanism of collection detector       fig. 2-6-13       fig. 2-8-14         Uetection unit       -       -       -         Warming-up time       2 min       -       -         Adjustment of zero       -       -       -         Adjustment of zero       -       -	Equal velocity aspiration side		SALASIN
Flow rate of sampling       aspiration side 201/min       351/sin         Flow meter       surface flow meter       none         Flow meter       surface flow meter       none         Yild or rate stabilyzer       sonic-nozzile       none         For high concentration       repeat measurement       none         Pressure difference allowable       sonic-nozzile       none         Sampling time (total sampling time in repeat measurement       separation system       none         Particle separation system       impactor       none       -         For inficiency       min.95% (max.10 µ particle)       -       -         Form of collection area       -       -       -       -         etection source a. type       optical iamp standard 5V3Å       operating velocity 4V       -         Detector       b. half life       optical voltage 500-700V       -       -         Mechanism of collection detector       fig. 2-6-13       fig. 2-6-14       -       -         Detection unit       -       -       -       -       -       -         Mechanism of collection detector       fig. 2-6-13       fig. 2-6-14       -       -       -       -       -       -       -       -       -	- Jam. Concernd Rebitation Didd	detection side SI/min	
detection side     11/min       Flow meter     surface flow meter     none       Surface flow meter     none     none       For high concentration     repeat measurement     none       Pressure difference allowable     -     50min       Sampling time (total sampling time in repeat measurement)     -     50min       Particle separation system     impactor     none       Collection efficiency     min.95% (max.10 µ particle)     -       Form of collection area     -     -       Etection unit     -     -     -       Detector     a. type     optical lamp standard 5V3A       b. half life     -     -     -       Mechanism of collection detactor     fig. 2-6-13     -     -       Mechanism of collection detactor     fig. 2-6-13     -     -       Mechanism of collection detactor     fig. 2-6-13     -     -       Mechanism of collection detactor     -     -     -       Meters     variation of frequency 100-3000Hz     -     -       Warming-up time     2 min     3hr     -       Adjustment of zero     -     -     -       Adjustment of zero     -     -     -       Adjustment of zero     -     -     - <tr< td=""><td>Flow rate of sampling</td><td>account on side 201/min</td><td>9F17/2010</td></tr<>	Flow rate of sampling	account on side 201/min	9F17/2010
Flow metter       surface flow metter       none         Ministry and the stabilizer       sonic-nozzle       none         For high concentration       repeat measurement       -         Pressure allowable       Sampling time (total sampling time in repeat measurement)       -         Particle soparation system       Inpactor       none         Volteting method       efectrostatic collection       -         Volteting method       efectrostatic collection       -         Volteting method       by corona discharge       -         Voltetion efficiency       min.95% (max.10 μ particle)       -         Form of collection area       -       -         etection unit       optical lamp standard 5V3A       operating velocity 4V         Detector       a. type       photo-effection applifyer N-388       operating voltage 500-700V         b. half life       sensitivity       in.2 yys       fig. 2-8-14         Detector       fig. 2-6-13       fig. 2-8-14       in.2 ys         Mechanism of collection detector       fig. 2-6-13       fig. 2-8-14         Detection unit       unity ys       sensitivity       operating wethod         Warming-up time       2 min       3hr       none statering plate method         Adjustme	The face of sampling	dependence and a limit	
3.2-321/min       none         Fight rate stabilyzer       sonic-nozzle       none         For high concentration       repeated measurement       -         Sampling time (total sampling time in repeated measurement)       repeated measurement)       -         Particle separation system       impactor       none       -         Collecting method       efectrostatic collection       -       -         Particle separation system       impactor       none       -         Collection efficiency       min.90% (max.10 µ particle)       -       -         Form of collection area       -       -       -       -         Detector ant       b. half life       -       -       -       -         Detector a. type       b. half life       -	Elow motor	auston flow noton	
Flow rate stabilizer       sonte-nozzle       none         For high concentration       repeat measurement       -         Pressure difference allowable       -       -         Sampling time (total sampling time in repeat measurement)       -       -         Particle separation system       inpactor       none         Collecting method       effectrosialic collection       -         Form of collection efficiency       min.95% (max.10 μ particle)       -         Form of collection area       -       -         etection source a. type       optical iamp standard 5V3A operating velocity 4V min. 4 months         Detector       a. type       operating voltage 500-700V min.2 yrs         Mechanism of collection detector       fig. 2-6-13       fig. 2-8-14         Detection unit       sensitivity       -         Detector init       Sensitivity       -         a. type       sensitivity       -         b. detector life       fig. 2-6-13       fig. 2-8-14         Detection unit       sensitivity       -       -         Detector       fig. 2.00-3000Hz       -       -         A. type	TTOW DIGLOT		none
For high concentration       repeat measurement         Pressure difference allowable	May note stabilizes		
Pressure difference allowable       Sampling time (total sampling time in repeated measurement)       28min x 2       60min         Particle separation system       Impactor       none         Collecting method       electrostatic collection       -         Viller paper       -       -         Collection efficiency       min.95% (max.10 µ particle)       -         Form of collection area       -       -         etection unit       optical lamp standard 5V3A       operating velocity 4V         Detector       a. type       optical lamp standard 5V3A         b. half life       operating velocity 4V       -         Mechanism of collection detector       fig. 2-6-13       fig. 2-6-13         Mechanism of collection detector       fig. 2-6-13       fig. 2-8-14         Detection unit       sensitivity       -         Mechanism of collection detector       fig. 2-6-13       fig. 2-8-14         Warning-up time       2 min       An         Adjustment of zero       reference armature       standard scattering plate method         Adjustment of zero       reference armature       standard scattering plate method         Adjustment of zero       coring the method       -         Average calculation system       ihr       accumulation			none
Sampling time (total sampling time in repeated measurement)       28min x 2       60min         Particle separation system       inpactor       nome         Collecting method       clectrostatic collection       -         Filter paper       by corona discharge       -         Collection efficiency       min.95% (max.10µ particle)       -         Form of collection area       -       -         cetection unit       optical imp standard 5V3A         Detector       b. half life       optical imp standard 5V3A         Detector       a. type       photo-effectron amplifyer K-386         b. detector life       fig. 2-6-13       Fig. 2-8-14         Detection unit       sensitivity       coefficient 180liz/0.001mg         Detection unit       sensitivity       coefficient 180liz/0.001mg         Warning-up time       2 min       3hr         Adjustment of zero       Acloov±10V       standard scattering plate method         Average calculation system       type       accumulation counting method         type       calculation system       standard scattering plate method         Marging-up time       Acitoov±10V       Acitoov±10V         Adjustment of zero       Acitoov±10V       Acitoov±10V         Average calculation syst		repeat measurement	
repeated measurement) Particle separation system inpactor none Collecting method efectrostatic collection by corona discharge			-
Particle separation system       inpactor       none         Collecting method       electrostatic collection       none         Filter paper       by corona discharge       -         Form of collection area       -       -         etection unit       optical imp standard 5V3A       -         Detection source a. type       optical imp standard 5V3A       -         b. half life       optical imp standard 5V3A       -         Detector source a. type       optical imp standard 5V3A       -         b. detector life       photo-efectron amplifyer R-386       -         b. detector life       min. 4 months       -         Detection unit       sensitivity       -       -         Detection unit       sensitivity       -       -         b. detector life       fig. 2-6-13       -       -         Detection unit       sensitivity       -       -         Uhers       variation of frequency 100-3000Hz       -       -         Warming-up time       2 min       -       -         Adjustment of zero       -       -       -         Adjustment of span       reference armature       standard scattering plate method         Verage calculation system       -	Sampling time (total sampling time in	28min x 2	60min
Collecting method       efectrostatic collection         Filter paper       -         Collection efficiency       min.95% (max. 10 μ particle)         Form of collection area       -         Retection unit       -         Detector       -         b. half life       -         Detector       -         a. type       -         b. detector life       -         Mechanism of collection detector       fig. 2-6-13         Detection unit       sensitivity         Mechanism of collection detector       fig. 2-6-13         Detection unit       sensitivity         Mechanism of collection detector       fig. 2-6-13         Detection unit       sensitivity         Ulters       variation of frequency 100-3000Hz         Warming-up time       2 min         Adjustment of zero       -         Adjustment of zero       -         Adjustment of span       reference armature         Atage       At100V±10V         Auge       -         type       -         required time       -         type       -         required time       -         type       - <tr< td=""><td>repeated measurement)</td><td></td><td>· · ·</td></tr<>	repeated measurement)		· · ·
by corona discharge         Collection efficiency       min.95% (max.10 µ particle)         Form of collection area	Particle separation system	linpactor	none
Filter paper	Collecting method		
Collection efficiency       min.95% (max.10 µ particle)		by corona discharge	
Form of collection area       -         Detection unit       optical lamp standard 5V3A         Detection source a. type       optical lamp standard 5V3A         b. half life       operating velocity 4V         min. 4 months       photo-electron amplifyer N-386         operating voltage       500-700V         b. detector life       fig. 2-6-13         Mechanism of collection detector       fig. 2-6-13         Detection unit       sensitivity         Illz variable compatible       theoretical weight sensitivity         coefficient 180llz/0.001mg       variation of frequency 100-3000Hz         Warming-up time       2 min         Adjustment of zero       pre-setted decreasing method         Adjustment of span       referrence armature         type       accumulation counting method         type       hr         type       max. 150W         Power source       AC100V±10V         Actionv±15%         Power sipply       max. 150%         max. 150%       approx.100VA	Filter paper	-	
ketection unit       optical imp standard 5V3A         Detection source a. type       optical imp standard 5V3A         b. half life       operating velocity 4V         min. 4 months       photo-effectron amplifyer R-386         a. type       operating voltage 500-700V         b. detector life       min. 2 yrs         Mechanism of collection detector       fig. 2-6-13         Detection unit       sensitivity         Detection unit       sensitivity         Detection unit       sensitivity         Ulters       wariation of frequency 100-3000Hz         Warming-up time       2 min         Adjustment of zero       pre-setted decreasing method         Adjustment of span       referrence armature         Average calculation system       type         type       accumulation counting method         for       fir         Power source       AC100V±10V         Power source       AC100V±10V         Power source       AC100V±10V         Actionv±15%	Collection efficiency	min.95% (max.10 µ particle)	
Detection source a. type b. half life       optical imp standard 5V3A operating velocity 4V min. 4 months         Detector a. type b. detector life       photo-efectron amplifyer K-366 operating voltage 500-700V min.2 yrs         Mechanism of collection detector       fig. 2-6-13         Detection unit       sensitivity Ullz variable compatible theoretical weight sensitivity coefficient 1801/z/0,001mg variation of frequency 100-3000Hz         thers       2 min Adjustment of zero         Adjustment of zero       referrence armature         Average calculation system type required time       1hr         hr       hr         Marking       1hr         Marking       1hr         Source       AC100V±10V         AC100V±10V       AC100V±15% approx.100VA			
b. half life Detector a. type b. detector life Mechanism of collection detector Detection unit Detection unit Hz variable compatible theoretical weight sensitivity coefficient 180Hz/0.001mg variation of frequency 100-3000Hz thers Warming-up time Adjustment of zero Adjustment of span Average calculation system type required time Power source Adjust me type required time Power source Adjust me type required time Detection b. half life pre-setted decreasing method hr Adjust ment of span Adjust ment of span Adjust ment of span type required time Power source Adjust me type required time Adjust me type ty			
b. half life Detector a. type b. detector life Mechanism of collection detector Detection unit Detection	Detection source a. type		optical lamp standard 5V3A
Detector       a. type         b. detector life       photo-efectron amplifyer N-366         Mechanism of collection detector       fig. 2-6-13         Detection unit       sensitivity         Unit       sensitivity         Detection unit	b. half life		
Detector       a. type       photo-efectron amplifyer N-366         b. detector life       photo-efectron amplifyer N-366       operating voltage       500-700V         Mechanism of collection detector       fig. 2-6-13       fig. 2-8-14         Detection unit       sensitivity       lllz variable compatible       theoretical weight sensitivity         coefficient 180Hz/0.001mg       variation of frequency 100-3000Hz       standard scattering plate method         thers       2 min       3hr         Adjustment of zero       referrence armature       standard scattering plate method         type       referrence armature       standard scattering plate method         type       nequired time       lhr       hr         Power source       AC100V±10V       AC100V±15%         Power supply       max.150W       approx.100VA         Weight       50kg       40kg			
a. type       operating voltage       500-700V         b. detector life       rig. 2-6-13       rig. 2 -6-14         Mechanism of collection detector       rig. 2-6-13       rig. 2-6-14         Detection unit       sensitivity       like compatible         Uthers       variable compatible       theoretical weight sensitivity         voefficient 180Hz/0.001mg       variation of frequency 100-3000Hz         Warming-up time       2 min         Adjustment of zero       pre-setted decreasing method         Adjustment of span       referrence armature         type       accumulation counting method         type       like         required time       like         Power source       AC100V±10V         Power supply       max.150W         Weight       50kg	Detector		photo-efectron amplifyer R-366
b. detector life Mechanism of collection detector Detection unit There are accumulation counting method Adjustment of span Adjustment of span type required time Power source Power supply Weight b. detector life min.2 yrs fig. 2-6-13 fig. 2-6-14 fig.		· ·	operating voltage 500-700V
Mechanism of collection detector       fig. 2-6-13       fig. 2-6-14         Detection unit       sensitivity       Illz variable compatible         Uters       unit       unit       intervention of frequency 100-3000Hz         thers       variation of frequency 100-3000Hz       intervention of frequency 100-3000Hz         thers       2 min       3hr         Adjustment of zero       pre-setted decreasing method         Adjustment of span       referrence armature       standard scattering plate method         Average calculation system       hr       hr         type       nequired time       hr         Power source       AC100V±10V       AC100V±15%         Power supply       max.150W       approx.100VA         Weight       50kg       40kg			min 2 vrs
Detection unit       sensitivity         Illz variable compatible       theoretical weight sensitivity         coefficient 180Hz/0.001mg       variation of frequency 100-3000Hz         thers       2 min         Warming-up time       2 min         Adjustment of zero       pre-setted decreasing method         Adjustment of zero       pre-setted decreasing method         Adjustment of span       referrence armature         type       accumulation counting method         type       accumulation counting method         required time       1hr         Power source       AC100V±10V         Power supply       max.150W         weight       40kg	Mechanism of collection detector	Fig 2-6-13	
IIIz variable compatible theoretical weight sensitivity coefficient 1801/2/0.001mg variation of frequency 100-3000Hz         thers       2 min         Warming-up time       2 min         Adjustment of zero       3hr         Adjustment of span       referrence armature         type       standard scattering plate method         type       accumulation counting method         required time       1hr         Power source       AC100V±10V         Power supply       max.150W         Weight       50kg		leeneitivity	115. 40 14
theoretical weight sensitivity coefficient 1801/2/0.001mg variation of frequency 100-3000Hz         thers Warming-up time       2 min         Adjustment of zero       pre-setted decreasing method         Adjustment of span       referrence armature         Adjustment of span       referrence armature         Adjustment of span       accumulation counting method         Average calculation system       hr         type       accumulation counting method         required time       1hr         Power source       AC100V±10V         Power supply       max.150W         Weight       50kg			
coefficient 180Hz/0.00 lmg variation of frequency 100-3000Hz       Whers Warming-up time     2 min       Adjustment of zero     pre-setted decreasing method       Adjustment of span     referrence armature       Adjustment of span     referrence armature       August and a scattering plate method       Burget and a scattering plate and a scattering plate method <td>•</td> <td></td> <td></td>	•		
variation of frequency 100-3000Hz         Warming-up time       2 min         Adjustment of zero       pre-setted decreasing method         Adjustment of span       referrence armature         Average calculation system       standard scattering plate method         type       accumulation counting method         required time       lhr         Power source       AC100V±10V         Power supply       max.150W         Weight       50kg			· · · ·
thers     2 min     3hr       Adjustment of zero     pre-setted decreasing method       Adjustment of span     referrence armature     standard scattering plate method       Adjustment of span     referrence armature     standard scattering plate method       Average calculation system     accumulation counting method       type     accumulation counting method       required time     lhr       Power source     AC100V±10V       Power supply     max.150W       Weight     50kg			
Warming-up time     2 min     3hr       Adjustment of zero     pre-setted decreasing method       Adjustment of span     referrence armature     standard scattering plate method       Average calculation system     accumulation counting method       type     accumulation counting method       required time     1hr       Power source     AC100V±10V       Power supply     max.150W       Weight     50kg	thore	variation of frequency 100-3000Hz	
Adjustment of zero     pre-setted decreasing method       Adjustment of span     referrence armature     standard scattering plate method       Adjustment of span     referrence armature     standard scattering plate method       Average calculation system     accumulation counting method       type     hr     hr       Power source     AC100V±10V     AC100V±15%       Power supply     max.150W     approx.100VA       Weight     50kg     40kg		9	0.
Adjustment of span       referrence armature       standard scattering plate method         Average calculation system       accumulation counting method         type       Ihr       Ihr         Power source       AC100V±10V       AC100V±15%         Power supply       max.150W       approx.100VA         Weight       50kg       40kg	naturing-up time	<b>14 0111</b>	ស្រាក
Average calculation system     accumulation counting method       type     accumulation counting method       required time     lhr       Power source     AC100V±10V       Power supply     max. 150W       Weight     50kg	Adjustment of zero		pre-setted decreasing method
type     accumulation counting method       required time     lhr       Power source     AC100V±10V       Power supply     max.150W       Weight     50kg		reserrence armature	standard scattering plate method
required time Ihr Ihr Ihr Power source AC100V±10V AC100V±15% Power supply max.150W approx.100VA Weight 50kg 40kg			
Power source         AC100V±10V         AC100V±15%           Power supply         max.150W         approx.100VA           Weight         50kg         40kg		, · · · · ·	
Power supply max. 150W approx. 100VA Weight 50kg 40kg			
Weight 50kg 40kg		NC100V±10V	
Weight         50kg         40kg           Size         522 x 640 x 1210         540 x 270 x 470           Ambient tenperature         5-40°C         -10-40°C			approx. 100VA
Size         522 x 640 x 1210         540 x 270 x 470           Ambient tenperature         5-40°C         -10-40°C	Weight	50kg	40kg
Ambient tenperature 5-40°C -10-40°C	Size	522 x 640 x 1210	540 x 270 x 470
	Ambient tenperature	5-40°C	-10-40°C

Item Measurement principle	355 Ultraviolet Fluorometry	Ultraviolet Fluorometry	43A Ultraviolet-puls Fluorometry	ASPA-350E Ultraviolet Fluorometry
Rentionmance 1 Measuring range and selection of range manuel of automatic	Instantaneous value 0-200/509/100ppdinstantaneous value 0-0.1/0. Automatic change and fix Manual selection Output of 1hr average at same range 1hr average (saw tooth type) 0-0.05/0.1/0.2/0.5/1.0ppm	Instantaneous vziue 0-0.1/0.2/0.5/1.0pp Manual selection Ihr average (saw tooth type) 0-0.05/0.1/0.2/0.5/1.0ppm	lustantaneous value 0-0.1/0.2/0.5/1.0pp Manual selection	Instantaneous value 0-200/509/100ppdinstantaneous value 0-0.1/0.2/0.5/1.0ppdinstantaneous value 0-0.1/0.2/0.5/1.0ppme
<pre>2 Repeatability (Reproducibility) 3 Drift a. zero 5 Span 4 Linearlity 5 Variation of voltage 6 Response time</pre>	mas. ±1%FS mas. ±1%fS mas. ±1%day mas. ±1%fS mas. ±1%FS mas. ±1%FS/100V±10V mas. 3min(90%)		XFS ppb/day max.±0.05%/C .5XFS/week max.±0.1%/C XFS XFS/100V±10V n or max.4min selection (95%)	max ±2555 max ±2595/day max ±255/day max ±255/day max ±1557/day max 3min(30%)
/ Detection limit 8 Resolution 9 Outputs	1.ppb 1.ppb DC0-1V	Lopb Dree figures of decimal point DOD-IY (Insulation of input signal) Instantaneous value and average	0.6pbb Four figures ppb 0-10mV or DCD-IV	2ppb Four figures of decimal point DCD-FV, 0-107 DCD-20A
whitertion of Sample 1 Inlet tube of ambient air sample 0 ther piping tube a materials 1 Inner piping tube a materials 1 Inner piping tube a materials 1 Inner piping tube a materials 2 Filter a materials 2 Filter b inner diameters(outer diameters) $\phi_4 T 5(\phi \delta_5, 3)$ 2 Filter a materials 2 Filter b inner diameters(outer diameters) $\phi_4 T 5(\phi \delta_5, 3)$ 3 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 3 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 3 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 3 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 5 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 5 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 5 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 5 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 5 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 5 Flow meter b inner diameters(outer diameters) $\phi_4 T 7 0$ 5 Flow meter b inner diameters) $\phi_4 $	meter Y pemetration, tube		Teflum 04(06), 06(08), 1/8"(1/4") Teflon 1/8"(1/4") Teflon 10"(1/4") Surface flow meter 0.1-11/min 0.5L/min 0.5L/min 0.5L/min 0.5L/min	Teflon 64(65) Teflon 64(66) feflon (for sample, for purging) 654 Surface flow meter 0.11/min 61/min 0.81/min 0.81/min
1 Warming-up time 2 Ambient-temperature 3 Power source 4 Consumption of electric power 5 Outer size main 6 Weight main pump	max, 120min 5-40°C 3000Y±10% 50 or 60Hz 300VA 620(U)x520(H)x490(H)mm 2280(U)x240(W)x415(H)mm 650K	max. 2hrs 0-40°C 1500 1500 550(D)x430(\$)x220(\$)±m 27ks	max. 60min 0-40°C 0-40°C 00%) ±10% 50 or 50Hz 100% 59(0)x432(W)x222(H)mm 19.5kg	mar. 120min 0-40°C Ac100/115/200V 50/60Hz both use 250(1))x450(W)X221(H)mm 250(1))x450(W)X221(H)mm

Table 5-7 SECTFICATION OF SULFER DIOXIDE ANLYZER ET ULTAVIGLET FUDGOBETET

Table	5-8	SPECIFICATION OF AUTOMATIC ANALYZER ON OZONE BY CHEMILUMINESCENCE	
Item	Iype Measurement principle	830P Chemiluminescence selection	Ghemiluminescence selection
Periormance I Measuring range and selection of range	of range	Instantaneous value 0-200/500/2000ppHInstantaneous value 0-0 1/0 2/0 5mp	Instantaneous value 0-0 1/0 2/0 5m
automatic		Automatic change and fix Output of lhr average at same range	Manual selection Output of Ihr average at same range
2 Repeatability (Reproducibility)	y)	max. ±2%FS	Tautumatic Tauge) max. ±2%FS
3 Drift a. zero h snan		max. ±2ppb/day mev. +2ooch/day	uax. ±1%FS/day سمبر ±2%ts/acy
Linearli		nax. ±2%FS	ч т •
 6 Response time	-	max.1min(90%)	Ē
 / Detection limit & Resolution		lippb Three fimires of decimals	lppb Thans fimmer of Josimol
9 Outputs		None	DC 0-1V
 Collection of Sample			
	· · · · · · · · · · · · · · · · · · ·		Teflon
 D. Inner vining tubo a motoriala	aeters (oute	-	(\$\phi(\phi(\phi(\phi(\phi(\phi(\phi(\phi(
 å e	neters(oute	1451.001     04 75( 06 3)	161100 69(63)
		Teflon	Teflon
 b. size		φ47	Ø 55
		Surface flow meter	Surface flow meter
	Ð	0-1. OL/min	0.2-1.5L/min
E Constitute of motion wind		0.5L/min	0.2L/min
Capacity of succion pump			uim/Jc
o riow rate of sampling 7 Flow meter for Ethvlene gas a	tvne	0.0L/min Pressire set	ZL/min Surface ture
			3-20ml/min
 Others		Thomas Course	
1 Warming-up time		max. 120min	max.60min
2 Amurate comparature 3 Power source		±10% 50 or 60Hz	10-40 C AC100V+10% 50/60Hz
 4 Consumption of electric power			approx. 400VA
 o ULLET SIZE DOGY PUMP		$\operatorname{HIM}(H)$ GZ GX (M) 00 GX (0) 0/ G	550(D)x430(W)x270(H)mm 285(D)x270(W)x280(H)mm
 6 Weight body		approx. 65kg	approx. 20kg
 Jump			approx, okg

Delection of photo pulse from rotation of windmil average both for wind direction and wind velocity Delection electrically transmitted by sincronous ±3m/s of value and less for 10m/s and over all directions 0-550° (360° shift type) ±0.3m/s and less for 10m/s and less motor of movement of fail wing DC0-1V for 0-10m/s or 0-20m/s0.4-10m/s or 0.4-20m/s approx.5kg and less power shot-down and under adjustment DC0-1V for 0-540° No fluctuation for  $100V \pm 10\%$ Indoor instrument 0-40°C approx.50VA and less span: max. ±0.1% Wind direction Wind direction Outlet signal for telemeter Wind direction Mechanism Wind direction Wind velocity Wind velocity Wind velocity Wind velocity [ransmitter  $ACI00V \pm 10V$ 0.5hr Ambient comp. permitted 4 Electrical fluctuation 4 Standard specification 2 Measurement precision 2 Electrical source 3 Power consumption I Measurement range l Warming-up time 3 Repeatability erformance 5 Weight Item )thers ഹ ဖ

SPECIFICATION FOR WINDMILL TYPE WIND DIRECTION/VELOCITY METER (PHOTO-PULSE TYPE)

Table 5-9(1)

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Table 5-9(2) SPECIFICATION FOR WINDMILL TYPE WIND DIRECTION/VELOCITY METER (ENGINE TYPE)

Mechanism	Wind direction	Delection electrically transmitted by sincronous
		motor of movement of fail wing
Item	Wind velocity	Delection of photo pulse from rotation of windmil
Performance		
l Measurement range	Wind direction	all directions 0-550° (360° shift type)
	Wind velocity	0.4-10m/s or 0.4-20m/s
2 Measurement precision	Wind direction	±0.3m/s and less for 10m/s and less
	Wind velocity	±3m/s of value and less for 10m/s and over
3 Repeatability	span: max. ±0.1%	
4 Electrical fluctuation	No fluctuation for 100V±10%	r 100V±10%
5 Outlet signal for telemeter Wind direction	Wind direction	DC0-IV for 0-540°
	Wind velocity	DCO-1V for 0-10m/s or 0-20m/s
		average both for wind direction and wind velocity
Others		
l Warming-up time	0.5hr	
2 Electrical source	$AC100V \pm 10V$	
3 Power consumption	approx.60VA and less	ess
4 Standard specification	power shot-down	power shot-down and under adjustment
5 Weight	Transmitter	approx. 5kg
6 Ambient comp. permitted	Indoor instrument 0-40°C	0-40°C

Table 5-10 ALLOWABLE ERROR CLASSIFIED BY TESTING ITEM FOR TARGET ANALYZER

	S0x	NOx	ОХ	NMHC	CO	SPM
Zero drift	±2%	±2%	±2%	±1%	±2%	±2%
Span drift	±2%	±2%	±4%	±2%	±2%	±3%
Repeatability	±2%	±2%	±2%	±1%	±2%	±2%
Lineality	±4%	±4%	:±5%	±5%	±5%	±5%
Stability of	±7%	±7%	±10%	±1%	±2%	±7%
sampling flow-rate						

	TT-C ATOPI		The attractionary the control below it is well and a transmission of the $TT=C$ at $TT=C$	
lype/measurement priciple	42 Chemiluminescence Method	APNA-350E Chemiluminescence Method	265P Chemiluminescence Method	GLN-31 Chemiluminescence Method
Performance 1. Measurement range and range selection manual/auto	Instantaneous 0~0.05,0.1,0.2,0.5,1,2,5 10,20ppm manual selection manual selection	ditto 0~0.1,0.2,0.5,1.0ppm manual selection	ditto 1~200ppb 0~0.2,0.5,2.0ppm manual or automatic change of range	ditto 1~200ppb 0~0.2,0.5,2.0ppm 0~0.1,0.2,0.5,1.0,2,5ppm manual or automatic change of rangechange between manual(a moment) and
<ol> <li>Repeatability (Reproducibility)</li> <li>Drift a. zero</li> <li>h. span</li> </ol>	aax. ±1%FS max. ±0.5ppb/day max. ±2%FS/day	max. ±2%FS max. ±2ppb/day, max. ±8ppb/l4daysmax. ±2ppb/day max. ±2%FS, max. ±8%FS/l4days max. ±2%FS, max. ±8%FS/l4days		mauuai of automatic (int average) max.±2%FS/day max.±2%FS/day
for fluctuation		ditto		max. 土と Aro max. 土2 AFS/100土10 V
6. Response time 7. Detection resolution 8. Output signal	within 40 min. (90%) 0.5 ppb DC 0~10mV or DC 0~1V	180min (90%,0.1ppm range) 2 ppb DC 0∼1/10 V,DC 4∼20 mA	100 min. (90%) 1 ppb DC 0~1 V	l80min (90%,0.lppm range) I ppb ←
<ul> <li>Collection of sampling</li> <li>1. Inlet tube of ambient air sampling</li> <li>- Outer piping a. material 4-fluoroethylene polymer</li> <li>b. inner diameter \$\phi4(\phi6), \phi6(\phi8), 1/4"</li> </ul>		φ6(φ8) ditto	φ4.75(φ6.3)	φ6(φ8) ditto
2 Inner piping a. material b. inner diameter	(uuter diameter) material 4-fluoroethylene polymer inner diameter 1/4"	φ4(φ6) ditto	φ4.75(φ6.3)	φ2(φ3) ditto
3. Filter a material 4-fluor b. size $\phi 47$ or 4. Capacity of sample air aspiration 6 1/min.	bethylene polymer ¢40	litto litto	ditto	φ55 8 I/min.
	app. 0. / 1/min. min. 60 min.	app. U.S 1/min. min. 120 min.		ditto
ð	50 or 60 HZ		5~40°C AC 100 V 50 or 60 HZ	0~40°C AC 100 V 50/60 HZ
4. rower consumption 5. Outer size body 6. Weight body	500 W 584 (D) ×432 (W) ×222 (H) 22 kg	app. 400 VK 550(D)×430(W)×221(H) 30 kg		250 VA 550(D)×430(W)×270(H) 32 kg

Table 5-11 Specification of Automatic ANALYZER ON NITROGEN OXIDES BY GENILUMINESCENCE.

## Table 5-12 SPECIFICATION OF HYDROGEN GENERATOR

Туре	OPGU-70A	0PGU-1500	ELHYGEN MARK V
Generation system	Electrolysis of	<i>←</i>	~
	water		
Purity of water (%)	Min. 99.999	Min. 99,999	←
Purification system	Pd alloy membrane	Solid high pd-ymev.	Pd membrane
· · · · · · · · · · · · · · · · · · ·	penetration method	electrolyte	pentration method
Flow rate of	150	225	150
generation			
Pressure of	0~3	0.2~4	0~4.2
generation			
Variation of	Non-variation	←	
pressure			
Warming-up time	20~40	<del>(</del>	app. 60
Ambient temperature	5~40	<i>«</i>	←
· · · · ·			
Consumption of	20	app. 10	app. 20
distilled water	· · ·		
Safety measure	Water level alarm	Water level alarm	
	Protection devices	Protection cercuit	
	for leakage of ele-	for overvoltage of	
	ctrolytic solution	electrolytic cell-	
:	by Pd-membvane des-	monitoring circute	
	tractive detector	of temp of electro-	
		lytic cell	
Power source	100±10%	÷	115 V
Consumption of	400	200	110
electric power			
Size	367×276×571	330×220×310	330×381×647
Weight	33	11	app. 25

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Ites	Priciple Type		DUB-33	185	B-ray adao BANIOI	BAM102	d   RIG102B	RICIO2U		1 1007 1
Performance	Neasuring range and charge of tange		4~-	0-5 mg/m3	0-10 mg/m3		0-10 mg/m3	×101020	APDA3000 0-5 #g/#3	APDA-350E 0-1.5 mg/m
	Resolution	1 µ g/a3	+-	+	ŧ		÷	e~		
	Repetability (triple)	max. $\pm 2x$			88x, ±3%	83x. ±21	-	-	e	•~
	Drift (24hr) A. zero(full scale) b. span(full scale)	nex. ± 2%		BAX. # 2%	aox. ± 2%		max. ±2%	<b>←</b>	aax. ± 2%	-
	Blank test (24hr)	nox. average 10 µ g/s3		nax. ±2¥ ⊷	nax. ±3%	4	иех. ±3% иех. 5µg/н.	•	nex. ± 3% Hax. averog	
	Linearity a. for perticle	aex. ±10%		Bax. ± 10%	max. ±10%			<u> </u>		
	calibration b. for particle suspended in air	nox. ±10%	-	нах. ± 55	nsz, ±10%	<b>4</b> -	wax, $\pm 10%$ max, $100 \mu g/m3$ $\pm 10 \mu g/m3$ min, 100		авх. ±10% пвх, ±10%	4
:	Stability of flow rate of	nax. ±7% /10 days	t	nex. ±5%	aax. ±7% V10 days	мах. ±5% /10 days	100μg/n3±1 nax. ±5%	<b>1</b> 01	Rax. ± 5%	+-
· ·	sampling air Fluctuation of	Span		брал	nax, ±3%	max. ±2%	Span			L
		aax. ±3% Flow rate		wax. ±3% Flow rate	(Span)	(Span)	rax. ±3% Flow rate	4	Span max. ±2% Flow rate	•
	Qui-put of	aax. ±5% 0-1 V	•	nax, ±5% l puls for	0-1 Y		max. ±5%		max. ±5%	
	teleneter			1 µg/#3 or 0-1 V	0-1 4		i puls for lµg/m3 or 0-1 V	•	0-1 V	0-1, 10 V, 0-16 mA:
Sompling	Inlet tube of	Vinyi	<b>\$</b>	? 12 mm ø			Vinyl	**	Vinyl	-
	ambiant air sample A. outer piping b, inner piping	chloride)5m Stainless steel 7m		[/ 12 xm ¢	Nstural rubber 6 mi		chloridel5m Vinyl chloride15m	1	chloride Ban Herd Vinyl	
		Vinyl chloride 7mm							chloride 9m	l
	Capacity of suction pump Flow rate of	50 1/min 18 1/min	60 l/min	60 1/min	140 1/sin	40 1/min	120 1/min	*	50 J/min	÷ *
	esapling Flow meter	Ares flow		18 1/min	15 1/min	-	20 1/min	+-	15 1/min	16.7 1/min
	· · ·	neter	• • •	-	<b>↓</b>	Mass flow mater	Area flow meter 3-30 1/min	••	Area flow Meter	Mass flow mater
	Flow rate stabilyzer	flow rate enalyzer	<b>←</b> .	+-	Constant flo# controller	Mass flow controlar	Regulator- type recycle flow control		Maas flow controler	<b>*</b> *
	For high concentration	repeat	4-	repeat	stop	repest	***	+-	•	•
	Range of difference of pressure at measurment		180 mmHg. 410 azilg	210 maHg. 340 naHg	250 mmHg, 450 mmHg	150-180 aaHg 300 aaHg	200 maHg, 500 maHg	<b>4</b> 44	150 zalig, 350 zalig	-
	Sampling time	55.5 min.	55.5 min.	57 min.	55 sin.	48-55 min.		53 min.	55 min.	•
	Sleve system	Cyclone type	÷	+	÷-	<b>\$</b>	(52 min.)	(52 <u>sin</u> ,) ←	(50 min.)	Optional: cyclone/
		Filtoring	<b>*</b> ~~			+-		+		inpactor +-
	Filter paper	AP-20	-	AP-20	AP-20 60 a (3 conth)	AP-20 20 m (2 month)	GR-25R roll type 60 m	<b>*</b>	Glass fiber filter (roll type,	Glass fibe filter
	Tapping efficiency	99.9 X		+			(3 month) ←		30an x 10a)	
	surface	10 sa¢	¢	il m¢	9 ma¢	11 29.0	11 mm ¢	<b>*</b>	12 un ¢	¢
Detection unit	a. kind b. half-lifa	147P9100µC1 2.62 yoars	944 4-4	t t	14C 100µCl 5730 years	 	14C 100µCi 6730 years	÷.	14C 100µC1 5730 years	1
	Detection apparatus a. kind b. desfined life	Semi- conductor detector	<b>*</b> -	Plactic scinlillatic probe	n	<b>€</b>		t-	<b>⊢</b>	
Others		Semi-stornal 2 hr.	* 1	pax. 2 hr.	1 hr.				aore than 2 years	
	Adjustment of zero	Auto-zero adjustment	<b>•</b>	***			no need	¢	2 hr. Auto	
	Adjustment of span	Adsorption film system	+-	+	<b>*</b> ~	•	•	•	adjustment ←	<b>*</b>
	Average calculation	Area count	+-	Saw tooth	_	-			Integrating	Saw tooth
		system, 1 hr.		туре					count system lhr	type 30 min. 1 } 3 hr. 12 hr
		AC 100 V	-	AC 100 V	•	AG 100 V		<b>\$</b> ~	• ·	24 hr.
	Power supply	(average)	(average)		less than 500 VA	±10% Nain 75 VA Pump 200 VA	less than 500 VA	<b>\$</b>	350 VA (100 VA)	400 VA
}			100 VA 75 kg	60 kg	100 kg	80 ba	10 1-			
	Size	460 x 500 x 1060	4	Kain 385 x	600 x 570	475 x 495	140 kg 700 x 500 x 1100	<u>+-</u>	50 kg(40 kg) 450 x 700 x 950 (370 x	30 kg 310 x 430 x 350
		1							230 x 230)	

Table 5-13 SPECIFICATION OF AUTOMATIC ANALYZER BY B-BAY ADSORPTION SYSTEM

**************************************		Lype	GXII-71M, 72A	1/4 UXII-73M
lten		Principle	Spectrophotometry	Spectrophotometry
Performance	Π	Measuring rage and	a moment 0-0.2, 0-0.5 ppm	a moment 0-0.2, 0-0.5 ppm
		selection of range	average 0-0.2, 0-0.5 ppm	average 0-0.2, 0-0.5 ppm
		Repeatability	automatic max. ±2%	automatic max. ±2%
	6	(triple, full scale)	μια, -Σ.ε.Α. :	
	3	(triple, full scale) Drift (24 hr.)	a. max. ±2%	a. wax. ±2%
		a, zero (full scale)	b. max. ±4%	b. max. ±4%
		b. span (full scale)		max. ±5%
	4	Linearlity (full scale)	max. 1:5%	max. III
	5	Compensation of	(GXH-72M option)	U. 0~-5.0%/C
		temperature		
	6	Stability of flow rate	max. ±5%/max. 10 days	max. ±5%/max. 10 days
		of sampling Fluctuation of power	max. ±1% of full scale	max. ±1% of full scale
	1	ridcidation of power	wax. 11, or full scale	Bax. 21% of full scale
	8	Responce time	uax, 10 min,	max, 10 min.
		(full scale 90%)		
	9	Inference of nitrogen	NO max. 4.5:±1.5 %	NO max. 4.5±1.5%
	h.,	oxides Efficiency of scrubber	NO2 max. 4.5±1.5 %	NO2 max. 4.5±1.5%
	10	EILICIENCY OI SCRUDDER	and. 33 8	min. 22 Y
	$\mathbf{m}$	Out-put of telemeter	a moment DC U-1 V	a moment DC 0-1 V
			average DC 0-1 V	average DC 0-1 V
		· · · · · · · · · · · · · · · · · · ·	0-200, 0-500 count/hr (0-500)	0-200. 0-500 count/hr (0-50
Collection	Т		a. tellon	a. teflon
of sample		sample, outer piping tube	b. 7 mm	b. 7 mm
		a. material b. inner diameter		
	z	Inlet tube of air sample,	a, teflon	a, tellon
		inner piping tube	b. 7 m	b. 7 mm
		a. material		
		b. inner diameter		
	3	Filter	a. teflon b. 55 mm	a. teflon b. 55 mm
	11	a. type b. Size(φ)		
	4	Flow meter	a. float type area	a. float type area
		a, type	flow meter	flow meter
		b. scale	b. 0.5-5 1/min	b. 0.5-5 1/min
		<ul> <li>c. minimum measurement at targeted flow rate of</li> </ul>	c. 0.1 1/min	c. 0.1 1/min
		aspiration	· ·	
	5	Capacity of suction pump	app. 8 1/min	app. 8 1/min
	6	Scrubber	a. Glass fiber filter being dipped in Chromium	a. ditto b. 800 cm3
		a, composition b. volume	tri-oxide, and sulfuric	
		J. 101000	acid	
			b. 800 cm3	
Gas		Flow rate of sampling	3 1/min	3 1/min
	┝╖┥	Liquid volume	2 m / m in	7 ml/min
	2	Liquid volume	3 al/ain	3 ml/min
	3	Absorbing liquid	a.dissolve 200g of potassium	a. dissolve 200g of potassiu
		a. compositon	iodide, 140g of potassium	iodide, 140g of potassium
		b. tank volume	dihydrogenphosphate and	dihydrogenphosphate and
		c. compensation of	360g of disodium	360g of disodium
		temperature d. method of using	hydrogenphosphate into 10 1 of water	hydrogenphosphate into 10 1 of water
		solution	b, 10 1	b, 10 1
			c. non	c. non
			d. circulating type	d. circulating type
	4	Absorption filter	a. activated corbon	a. actirated corbon
		a. material	b. 500 ml	b. 500 ml
	5	b. volume Pump for absorption liquid	a. 10 ml/min	a. 10 ml/min
	ľ	a. volume	b. hard vinyl chloride	b. hard chloronated binyl
		b. material		
	6	Purification of counter-		a. 40-50 ml/min
		current absorbing tube		b. purification by distilbed
		a. volume b. delivery own		water a Recovery of washing metay
		b. delivery pump c. suction pump.		<ul> <li>c. Recovery of washing water</li> <li>d. 5   polyethylence tank</li> </ul>
		d. distilled water.		a, o i bolletillicince fang

## Table 5-14 SPECIFICATION OF AUTOMATIC ANALYZER FOR OXIDANT

·····	-sicks and	Туре	GXH-71M, 72M	2/4 GXH-739
Item		Principle	Spectrophotometry	Spectrophotometry
Photometry	TΤ	Cell a. length	a. 20 m	a. 20 m
	<b>–</b>	b. form	b.	b.
		c. capacity	c. 2.7 ml	c. 2.7 ml
		d. materials	d. glass	d. glass
	2	Ligtht source	a. 8 V 50 W	a. 8 V 50 W
	1	a. specification	b. 40 V	b. 40 V
		b. vlotage of power source		c. min. 6 months
		c. distined length		
	1	(continuous use)		
	3	Light tube	a. PV-16	a. PV-16
	1	a. specification	b. 68 V DC	b. 68 V DC
		b. vlotage of power source	c. min. 1 year	c. min. 1 year
		c. life time	· .	
-		(continuous use)		
	4		a. 365 nm, 20-25 nm	a. 365 nm, 20-25 nm
		a. wave length	b. metal interfence filter	b. metal interfence filter
		b. ceterials		
Others	1	Warming-up time	4 hr.	4 hr.
	2	Adjustment of zero-span	a. auto. manual zero	a, auto, manual zero
		a. zero	adjustment	adjustment
		b. span	b. auto. manual span	b. auto. manual span
			adjustment	adjustment
				c.
		and the second		
	3	Average calculation system	8.	a.
		a. type		· · · · · · · · · · · · · · · · · · ·
		b. required time of	b. 1 hr.	b. 1 hr.
		average		
	4	Washing		
		παοπτιήζ	non	auotmatic or manual
	5	Power source voltage	AC 100 V ± 10 %	AC 100 V ± 10 %
	6	Power supply	app. 150 VA	app. 150 VA
	T	Weight	app. 110 kg	app. 11.5 kg
	8	Size	450(D) x 450(W) x 1580(H)	450(D) x 450(W) x 1580(H)
	6	Ambiant tomponoture		
	19	Ambient temperature	0~40°C	0~40°C

and the second secon	*****		0x-7	www.	(3/4)
Item		Type Principle		UX-8 Spectrophotometry	APOA-3100 Spectrophotometry
	ΤŤ	Measuring range and	a moment, average	a moment, average	a moment, average
		change of range	0-0.2ppm, 0-0.5ppm	0-0.2ppm, 0-0.5ppm	0-0.2ppm, 0-0.5ppm
			manual automatic	manual, automatic	0-1, 0ppm(average)
					manual, automatic
	Z	Repeatability	max, ±2%	max. ±2%	nax. ±2%
		(triple, full scale)		· ·	
	3	Drift (24 hr.)	a. max. ±1%	a. max. ±2%	a. max. ±2%
		a. zero (full scale)	b. max. ±2%	b. max. ±2%	b. max. ±4%
	-	b. span (full scale)	1		
	4	Linerality (full scale)	Dax. ±2%	max. ±2%	max. ±2%
	┢	Stability of flow	±5%/max. 10 days	±5%/max. 10 days	±5%/max. 10 days
	ľ	rate of ambient air	2007 max. 10 uays	LUAT Wax. 10 days	10 days
	6	Variation of voltage	max. ±1% of full scale	max. ±1% of full scale	max. ±1% of full scale
					Lan 210 of fair beare
	7	Responce time	max. 9 min.	max. 9 min,	max. 10 min.
•		(full scale 90%)			
	8	Inference of	NU max. 4±1%	NO max. 4±1%	NO max, 4,5±1.5%
		nitrogen oxides	NO2 max. 4±1%	NO2 max. $4 \pm 1\%$	NO2 max. $4.5 \pm 1.5\%$
	9	Efficiency of	min. 99 %	min. 99 %	min. 99 %
	h <del>7</del> -	scrubber Oup-put of telemeter	instantaneous DC 0-1 V	instantanceur INA 1 V	inctantana N.A.I.V
	10	oup-har of relemetet	average DC 0-1 V	instantaneous DC 0-1 V average DC 0-1 V	instantaneous DC 0-1 V average DC 0-1 V
			average DO U-1 Y	average DU U-1 V	0.16 mA or 4-20 mA
Collection		Inlet tube of air	a. teflon	a. teflon	a, teflon
of sample		sample.	b. 6 mm	b. 6 mg	b. 6 mm
		outer piping tube			
		a. material	•		
		b. inner diameter			
	2	Inlet tube of air	a. teflon	a. tellon	a. teflon
		sample,	b. 6 mm	b. 6 mm	b. 4 mm, 6 mm
		inner piping tube			
		a. material b. inner diameter	· ·		
	प	Filter	a. teflon	a. teflon	a, terlon
	Ň	a. kind	b. 47 m	b. 47 mm	b. 90 mm
		b. Size( $\phi$ )		0. 17 88	
	4	Flow meter	a. area flow meter	a. area flow meter	a. float type area
		a. kind			flow meter
		b. scale	b. 0.5-5 1/min	b. 0.5-5 1/min	b. 0.5-5 1/min
		c. min. scale of	c. 0.1 1/min	c. 0.1 1/min	c. 0.1 1/min
	┯┤	sampling flow rate		· · · · · · · · · · · · · · · · · · ·	
	9	Capacity of suction	12 1/min	6 1/min	5 1/min
}	- 17	pump Scrubber	a. Glass fiber filter	a, Glass fiber filter	a. Glass fiber filter
	~	a. composition	being dipped in	being dipped in	being dipped in
		b. volume	chronium trioxide,	chromium trioxide,	chromium trioxide,
i i i i i i i i i i i i i i i i i i i	1		sulfuric acid and	sulfuric acid and	sulfuric acid and
			solution	solution	solution
			b. app. 100 cm3	b. app. 100 cm3	b. app. 800 cm3
Gass	Т	Flow rate of sampling	3 1/min	3 1/min	3 I/min
1		Liquid volume	7 ml/min		
	2	PIGATA ADIOMG	3 ml/min	3 ml/min	3 ol/ain
ŀ	31	Absorbing liquid	a. dissolve 200g of	a.dissolve 200g of	a.dissolve 200g of
		a. compositon	potassium iodide, 140g	potassium iodide, 140g	potassium iodide, 140g
		b. tank volume	of potassium dihydro-	of potassium dihydro-	of potassium dihydro-
1		c. compensation of	genphosphate and 360g	genphosphate and 360g	genphosphate and 360g
		temperature	of disodium hydrogen-	of disodium hydrogen-	of disodium hydrogen-
		d. method of using	phosphate into 101 of	phosphate into 101 of	phosphate into 101 of
		solution	water	water	water
l			b. 10 I	b. 10 1	b. 10 1
			C. non d. girculating two	c. non	C. NON
ŀ	7	Absorption filter	d. circulating type a. activated corbon	d. circulating type A. actirated corbon	d. circulating type
1	Т	a. material	b. app. 400 ml	b. app. 400 ml	a. activated corbon
	·	b. volume	N. UM. TO BI	o. app. 400 mi	b. app. 400 ml
H	5	Pump for absorption	a. 15 ml/min	a. 10 m1/min	a. 10 ml/min
1					
ļ		liquid	b. teflon coating	b. silicon tube	b. hard chloronated
		a. volume b. material	b. terlon coating diaphragm pump	b. silicon tube	b. hard chloronated benyl-teflon

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					(4/4)
-		Туре	0X-7	8-X0	AP0A-3100
lten		Principle		Spectrophotometry	Spectrophotometry
Photometry		Cell a. length b. form c. capacity	a. 35 mm b. 10 mm cell c. 3.5 ml	a. 35 mm b. 10 mm cell c. 3.5 ml	a, 20 mm b, 10 mm cell c, 2,5 ml
		d. materials	d. pylex glass	d. pylex glass	d. pylex glass
	Z	Ligtht source a. specification	a. 12 V-23 W single source	a. 7 V-13 W single source	a, 4 W black light
		b. voltage of power	b. 7.0 V	b. 6.0 V	Ь. 100 V
		source c. life	c. app. 4 months	c. app. 4 months	c, more than 1 year
	<b>_</b>	(continious use) Light tube	a. PV-16	a. R-414	a. G-1127
	Ů	a. specification	b. DC 70 V	b. DC 15 V	b. DC 70 V
		b. vlotage of power source	c. app. 2 years	c. app. 2 years	c. more than 1 year
		c. life (continious use)			
	4	Interfence filter a. wave length	a. 365 nm b. metal interfence	a. 365 nm b. metal interfence	a. 365 nm b. collar glass
· .		b. meterials	filter	filter	filter
Others	1	Obsorption time	1 hr.	l hr.	l hr.
	Z	Adijustment of zero-span a. zero b. span	a. auto zero adjustment b. manual span adjustment	a, auto zero adjustment b, manual span adjustment	a, auto zero adjustment b. manual span adjustment
	3	Average calculation a. type b. required time of average	a. AD-18 b. 1 hr.	a. non b. 1 hr.	a. non b. 1 hr.
	4	Power source voltage	AC 100 V ± 10 %	AC 100 V ± 10 %	AC 100 V ± 10 %
	5	Power supply	normal 150 VA maximum 250 VA	normal 150VA(210VA) max. 250VA(260VA)	normal 150 VA maximum 250 VA
	6	Weight	app. 80 kg	app. 80 kg	app. 130 kg
	7	Size	500(D) x 450(W) x 1550(H)	450(D) x 530(W) x 1565(H)	590(D) x 450(W) x 1650(H)
	8	Ambient temperature	0~30°C	5~35°C	0~40°C

Table	5-15	SPECIFICATION OF	AUTOKABIC ANALYZER	ON CARBON MONO OXIDE

					المتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية والمتعادية و		1/2
Principle	Туре	NDIR	APNA-3500 ←	540 ←	COA-401A ←	AIR-122 ←	GIλ-72M ↓-
Performance		(1)0-5,0-10,0-20		0-10,0-20,0-50pp	2 0-50.0-100ppa	0-10, 0-20, 0-50pr	
	selection of range		0-50 (2)0-5,0-10,0-20		a nanual change	a moment value i	(2)0-5,0-10,0- (3)0-2,0-5,0-1
	manual, automatic	0-50 (3)0-10,0-20,0-5	0-50 ( (3)0-10,0-20,0-50	change		nanual change average value is	a moment manua
		0-100 (4)0-10,0-25,0-5	0-100 ( (4)0-10,0-25,0-50	d		automatic ganual change	change for 3 range
		0-100 a moment, manual	0100				automatic or manual change
		change	change , intergrated value				3 range
		sanual change	manual change				
	Repeatability (triple, full scale)	bax, ±2%.⊷	Bax. ±1%	Dax. ±1%	12ax. ±1%	pax. ±1%	nax. ±1%
	Drift (24 hr.)	a. zero	a. zero	a. max. ±1%	8. pax. ±2%	a, zero	a. max. ±0.5%
	a. zero (full scale) b. span (full scale)	b. max. ±2% /7 days	b. max. ±2% /7 days	b. max. ±2%	b. max. ±1%	b. max. ±2¥	b. max. ±1.5%
	Linearlity (full scale)	max. ±2%	Bax. ±2%↔	cax. ±2%	Bax. ±1%	Bax, ±2%	nax. ±2%
	:						
	Stability of flow rate	max. ±3%	<b>€</b> −	sax. ±5%	max. ±5%/day	max. ±5%/day	Dax. ±3%
	of ambiemt air	/7 days			⊈ax. ±10%  /7 days	max. ±10% /7 days	
	Fluctuation of voltage	uax. ±1%	*	max. ±1%	max. ±1%	max. ±1%	5ax. ±1%
		-					
	Stability for fluctua- tion of the atmospheric pressure	nax. ±1%	é	cax. ±1%	max. ±1%	max. ±1%	cax. ±1%
	Interference	min. 0,5 ppm	min. 0,2 pps	пах. 0.5 ррв	min, 2 ppo	ain. 0,1 ppm	min. 0.5 ppm
	Response time (full scale 90 %)	zin. 60 sec.	4	120 sec.	пах. 60 sec.	max. 120 sec.	nax. 120 sec.
	Out-put of telezeter	DC 0-1V 0-16mA	f.,	DC 0-IV	DC 0-1V	DC 0-1V	average and a
		↔ or DC 0-1¥ 4-20⊡∕					instantaneous value DC 0-1V
	Flow rate of sampling	app. 6 1/min.	app, 2 l/min.	2.0 1/ain,	1 1/min.	app. 5 1/min.	app. 2 1/min.
	Inlet tube of ambient air sample	a.teflon —	+	a. teflon	a, teflon	a.teflon	a, teflon
	Outer piping tube	b,6 m		b.7 txa	b,6 ma	b.6 📾	b.7 ma
	Inner piping tube a.materials	a.teflon	<b>*</b>	a.poly ethylene		a.teflon	a.teflon
ŀ	b.inner diameter Coarse filter	b.4 ra None		b.7 ma a.glass wool	a glass	b.4 nan	b.4 mm
	a. caterials	nous		_	a.glass wool	None	None
}	b. inner dianeter Fine filter	a.glass wool		b.55ms a.glass wool	b. 120nn a.glass wool	a.glass wool	a.glass #00
	s. paterials b. inner diazeter	b.expension filter 320cz		b. 55m	b. 55m	b. 70mm	b. 55m
-	Flow meter a. type	t	t	a. rotary neter	a.float type	a.rotary meter	a.float type
	b. scale	b.1-10 1/min.		b. 0. 2-2. 0 1/min.	flow meter b.0.2-2.0 1/min.	b.0.3-3.0 1/min.	flow meter b.0.2-2.0 1/min.
F	c. min.scale Capacity of suction pump	c.0.5 1/min. 12 1/min.		c.0.1 1/min. 3 1/min.	c.0.5 1/min. app.13 1/min.	c. 0. 1 1/min. app. 5 1/min.	c.0.2 1/min.
					-priv ijulii,	oppio if situ	
1	Tepperature adjustment method	ditto	ditto	with temp. calibration system	PID control	- excluding dehumidifler - Analysis:	
	Cell a. length	a. 35m	a. 110an	a. 500um	a 250-	PID control	- FAX
	b. form	b.cylindrical	B.ditto	b.cylindrical	a.250ma b.cylindrical	a.450mm b.cylindrical	a.500ma b.cantal wire
	c.volume d.materials			c. 108a I	c. 75al	c. app. 140a1	c. app. 200al
	4. DALEI 1818	A'VIIN 91021	d.Stainless steel and gold plating	internal, Gold	d.glass, glass and internal	d.glass and internal gold	d.Sus 304 internal gold
			internal	plating	gold plating	plating	plating

							2/2
	Туре	APKA-3000	APWA-3500	540	COA-401A	AIR-122	GIX-724
Principle		NDIR	<u>د</u>	<b>*</b> -	<b>•</b>	<b>ę</b>	é –
	Light a. specification	a. cantal wire	a. cantal wire	a.ditto	a.ditto	B excluding dehusidifier - Analysis:	a.ditto
	b. voltage of power source	b.DC 10V	b.DC 5V	6. DC 20V	b.DC 7.6V	PID control b.DC 12V	b.DC 20V
	c. Life (continious use)	c.app.5 years	c.app.5 years	c.app.5 years	c.app.3 years	c.app.5 years	c.app.5 years
	Detector a. type	a. condenser and micro panel	s. ditto	a.micro flow type		a, di i to	a.micro flow typ
	b, destined length (continious use)	b, app. 5 years	b.app.5 years	b.app.5 years	b.app.5 years	b.app.5 years	b.app.5 years
	Interference filter a. wave b. materials	a.4.7µ	4	CO2 gas filter	None	None	a.CO2 gas filter b.CO2 gas filter
Others	Warming-uptime	4 hours	4 hours	4 hours	8 hours	1 hour	app.4 hours
	Adjustment of zero-span a. zero	a. No need	a, None	a.equipment for zero-gas	a.automatic calibration	a. None	a.automatic calibration
	b, span	b.automatic calibration			b.automatic calibration	b, autosatic calibration	b.automatic calibration
	Average calculation a. type b. required time of average	a.None b.1 hour	a, None b. 1 hour	a.None b.1 min.,5ain., 1 hr	a.VMH-102 b. l hr	a.None b. 1 hr	a, None V, 1 hour
	Power source voltage	AC100 V±10X	AC100 V±10X	AC100 V±10%	AC100 V±10%	AC100 V±10%	AC100 Y±10%
	Power supply	a.normal 250VA	a.normal app. 200VA	a.ave. 200VA	a.norgal 350VA	500VA	app. 250VA
		b.cax. apporoxicately 600YA (start)	b.max, apporoximately 300VA	b. sax, 240VA	b.normai 500VA	:	
	Veight	app. 120kg	app. 60kg	135kg	app. 150kg	app, 100kg	app, 160kg
	Size	590×450×1650	550×450×1650	570×500×1560	600×600×1600	520×450×1180	500×460×1580
	Ambient temperature	0~40℃	0~40°C	5~40℃	0~35°C	0~40°C	0~40℃

	UHC-15M	H(JH-3AS	Ab-4A	. AG-202	F02-30	APA-3000	
Principle Component Range (ppmc) Wessurement cycle (min).	gas-chromatography CH4, MeiC 0-5 0-10 10	CH4, NAEIC (or MEIC, THC) → 10			GMA, MMHC, THC 0−5 0-20 0-10 0-50 (arbitary setting)	CH4, NMC 0-5-0-10-0-23 6	
recording	4-pens recorder instantaneous value of each creord Thrand record Ihr average Saw tooth record	er vælue aent ard	Colour wise record of instantaneous value, average for Methane, average for Methane, hydro-carbon	Grpens recorder instantaneous value instantaneous value in average Trend record Saw tooth (option)	Greens recorder Instantaneous value of each component Trend record Ihr average Saw tooth Peterion of trend	4-peas recorder Instantaneous value of each component Trend record Ihr average Saw tooth record	
Recordor a. Effective record width 1 b. Input voltage (DC) 0	ti 1805an 0-17		t t	11	1	0-1V ←	0-IV
o, span adjustment intake of zero-gas zero calibration intake of gon gas span calibration	Auto Auto, Manual Auto, Manual Auto, Manual	Electrical zero setting	Not necessary Not necessary Auto-adjustment by automatical ly introdu- ced standard gas every one to 30 days	†††	↓↓↓	¥anuua I	
Signal of telemeter a. output (DC) b. kind of signal	C-IV in addition to EBC	-Burn-out of flame	-CH4, NHC, THC	-CH4, NHIC instantaneous	-CH4, NMRC, TEC	-CH4, NMEC instantaneous	-CIM, NMC, THC
	-MME instantaneous analog output -MME average analog output -IHC instantaneous value analog output -IHC instantaneous analog output -IHC average analog	-Electrical shut-down signal -Signal under adjustment -Measurement range signal -Introduction signal	instantaneous value -CH4, NMHG, THC average value average value fine, under failure, adjustment -Saw tooth type output reset reset	value -CH4, NHHC average value -Under adjustment -Under dom -Correction data reset -Failure -Burn-out of flame -Electrical shut-dom	instantaneous value -CM4, NGHC, THC average value -Measurement range, data reset data reset data reset ent telemeter dom -Under correction -Remote correction		instantaneous value -Ejectrical shut-dom signal under adjusta -Signal under adjusta -Shut-dom of central station station signal
	-Trubble output (abmorrad of base value) -Trouble output (failure of adjustment)		-The trouble, Electrical shut-down, time set Separ range, Nopon range etc.		Burarout of flame Correction failure signal signal failure signal (CRU abnormal, pressuredown, temperature abnormal, petertor vilue abnormal,	auto-correction start)	
lydrogen gas shut-down devices	-Detection of temp. of flame -Hydrogen shut-down valve working	-Thermo-couple type -flydrogen generator, power source shut-down type	Wagnet(optional supply) shut-down for nitrogen generator power source or feed of hydrogen	-Sensoriless -Shut-off on magnet	4	-Thermo-couple type, -Shut-off on magnet	betection of fiame temp fiyerogen shut-down valve type
rformarce Repeatability (triple)(full scale)	82x ±1%	t	ł	eax ±1%	-	ţ	ł
LITIT a. zero (full scale) b. spen (full scale) Linearity (full scale) scariority (full scale)	122. 118 122. 128 123. 158	+ **** ±0.5%	eex. ±1% eex. ±2% eex. ±2%	1 ↓ ↓ 1000 ± 1000	111	■azr. 土乙。 ■azr. 土乙。	111

		HCH-3AS	HOH-4A	AG-202	AG-203	APHA-3000	130
Stability for change of	1 -Smond The Zern drift	ļ	1	ł	1	ł	1
ambient tencerature		1	Ļ	ţ	ţ	f.	1
a zero-drift	-emong the span drift						
Voltese recistance	Tield	ł		+	+	ţ	-
Variation of voltage	±1% of max measurement ±0.2% of max measure	±0.2% of max measurement	±1% of max.measurement	±1% of max measurement	1	ł	1
Insulation resistance	ain 4M th at DC500Y	ļ		min.2MC	ł	uin.240 at DC500V	ł
Collection of sample Inter tube of ambient		-		-			
air saole							
Outer piping tube		~					
	Terlon	ţ	4-flolide ethylene resin	1.	1	1	ļ
b. immer diameter (mm)					•		1/4 1000
inter piping tube	let lon, Sub	ter ton	usar ara	Tofice A SRI		1e1 100	1/2 theh
a. materials h immedianter (me)	4.4.1	4		ices "4 moltal		*	17 - TIRAL
C. INNEL UIATEUCI VIEV				. 9 2 2 4 5 5 5 5 5 4 4 4 4 2 2 2 4 4 4 4 4		**************************************	
	Glass fiber	40	4-flutide ethylene resid	Teflon	ļ	ł	1
		2	40			80	47
1	in the second		approx. 2	1-2		~	1
- <u>B</u>	4.5-5.0	10	10	Ś.	•	Ļ	4
	e e	0		(January) 342-10	1	Ciliano IV EED	
L IIIICT	LOURSE	(Pre-colum)	(Pre-column)				LUISPACE 4 (LOSCIERT)
		Activated carbon	Activated carbon	Perapach PS (Column2)		Porapach Q (Columni)	Duranach (Coluan2)
		(Main column)	(Main column)	Activated carbon(Column3)		MS-13x (Column2)	Carbo sheep S(Column3)
b. mesh of filler	20-80	80-100 (Pre-column)	50 (Pre-column)	80-100 (Pre-co)uma)	1	60-80	each column 50-80
		30-60 (Main-column)	50 (Main-column)	SU-SU (Main-column)		2 2 2	
c. length (m)	0-T+0-T	(rre-column)		1.5 (column 1),	ţ	L./ coluen 1, U.3	3 feet (column 1) 2feet
				0.2 (column  2)			(° '7 mm)(0) 1001 1
d imer dizector (m)	63	2 (Pre-colum)	3 (Pre-column.	3	ţ	5	2.4
		3 (Main-column)	main column)				
e. destined length	l year	2 years	1-2 years	sin. 1 year	ł	ł	2 years
Temperature of column(C)	8	ţ	1	ŧ	ţ	3	02
Carrier eas							
a. kind	2	ţ	ţ	ţ	t	t	ţ
b. flow rate (million)	\$	100-150	80-80 80-80	30-40 	1	approx. 80	8
riel Eas	ş	:					
4. Kind 2. Citer () ()	NY NY				F 1		
	The route of		NC-05			approx 40	
iguitiourizpicuaige gate 2. kind	Removal of hydro carbon air	air	zir	ł	ţ	ţ	1
	from ambient air		1	1	-		
b. flow rate (al/min)			0.5	0.5	<b>↓</b>	0.35 	0.5
c. purification	method by catalyst	LONDRELION REALING		LOBLECTING TIXES DELFOG	1	by catalyst	ţ
)thers Ashimut temperature (TC)		Į	50-40	SQ-40	ł	0-40	
Poer surce voltner (AC)	****			ļ	ł		•
Consumption of electric	65	<b>BAX.</b> [206	800	450		700	260
poter (VA)			<b>V</b> at	· · · · · · · · · · · · · · · · · · ·		. т. м. т.	
	TW.	04 . K002-12/(-7.%)	RUN-FUN-TRIN	510+520+18001		-	
		0.0010047100	OWNEDWICK	DIUXACAUNU	UNATIVALIAN I	-	

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# Table 5-17 SPECIFICATIONS FOR AUTOMATIC ANALYZER FOR NITROGEN OXIDES

			1/6
	Type	GPH-74M	232
NAMES OF A STATE OF A STATE OF A MARKED AND A DESCRIPTION OF	ring Method	Molecular Absorption	
Performance			
1 Measuring ranges and change of the ranges		NO, NO2, 0-0.1, 0.2, 0.5ppm	. <b>€</b>
manual/automatic		manual or automatic change over switch	
2 Repeatability (reproducibility)(3 times, on	full scale)	within±2%	<b>(</b>
3 Drift (in 24hr) a. zero (on full scale)		a. within±2%	<b>6</b>
b. span (on full scale)		b. within±2%	←-
4 Linearlity (indication error)(on full scale)	1	within±4%	. <u></u>
5 Stability of flow rate of sample ambient air	to ageing	within±7%/10 days	←
(specified flow rate)			
6 Stability to variation in power source	· ·	within±1%	<b>←</b>
(variation of $\pm 10\%$ of the rated voltage on	full scale)		
7 Error in sampling quantity of absorbing solu	ition h	within±2%	-
8 Netrogen-dioxide-collecting rate (NO2 0.1-2p	opa) (aq	97% or more	99% or more
9 Output of telemeter	I	DC 0-1V	<b>+</b>
Collection of Sample			
l Sample ambient air inlet			
- Outer piping tube a, materials	8	a. Teflon	<b>←</b>
b. inner diameter		), <b>7</b> m9	<b>▲</b>
2 Sample ambient air inlet			
- Inner piping tube a. materials	a	. Teflon	←-
b. inner dianeter		). 4am	<i>(</i>
3 Dust filter a. materials		ı, Teflon	<b>←</b>
b. outer diameter			b. 47mm
4 Flow-meter a. type	ł	. float type variable area flow-meter	€-
b. range			b. 30-300ml/min
c. measuring precision at		· · · · · · · · · · · · · · · · · · ·	c.5ml/min
c. measuring precision at points	weasuring c		C. 00170111
5 Capacity of sample ambient air suction pump		prov OI /- in	
itrogen dioxide absorber		pprox.8L/min	approx.5L/min
		5-1- 20	F0 -
Sampling time	1		56min
Flow rate of sample ambient air			200ml/min
Volume of absorbing solution			30m1
Absorbing solution a. composition		. sulphanilic acid 100g	<del>&lt; .</del>
(amount of reagent per 20)	L) -	acetic acid 1000ml	<b>~</b> ~
		N-1-naphthy1-ethylene-diamine	←
		dihydrochloride lg	
b. method of using solution	on b	. circulating type	<b>←</b> 1,2
c. capacity of tank	c	. 20L	←
d. compensation for temper	rature d	. temperature control	d. temperature contro
	:	at 20°C in the measuring section	at 25°C in the
		·	measuring section

				X
				2/6
anal Constants and a last solutions in successful and the solution of the film of confidence	Constitution of the Constitution of Constit	Туре	GPH-74M	232
Ite		Measuring Method	Molecular Absorption	<b>6</b>
Constitution of absorb	er		tor C	HH
		: .		
Cotorimeter			110	
1 Čell	a. length		a. approx.40.6mm	a. approx.40mm
	b. form		b. cylindrical	<b>←</b>
	c. capacity		c. approx.42ml	c. approx.25ml
	d. material		d. PVC hard glass (cell window)	d. Pyrex
2 Light source	a. specification		a. LED; 550nm width 25nm	a. LED; 555nm
				width 25nm
	b. power voltage		b. 2-3(50mA) pulse lighting	b. 30mA pulse lighting
3 Photometry part	c. life (continua) a. specification		c. more than one year a. silicon-planar photo diode	c. more than 10 years
- moremony part	b. voltage	1	a. siricon-planar photo diode b.	a. silicon photo diode b.
		th (continous use)		c. more than 10 years
4 Interference filter			a.	a.
	b. meterial		b.	b.
Ithers				
l Warming-up time			2 hrs	4 hrs
2 Adjustment of zero-			a. automatic-zero adjustment	<del>«</del>
2 Demos 11	b.span		b. manual-span adjustment	<del>~</del>
3 Power source voltag 4 Consumption of elec			AC 100V ±10%	←
5 Weight	UIIC POMEL		approx.200VA approx.125kg	approx. 190VA
- HOLGHU			(including 20L absorbing solution)	approx.110kg
6 Size			500 x 460 x 1580	570 x 500 x 1550
		ſ	ANY IN AUGU	

		3/6
Туре	NX/18	APNA-3100
Item Measuring Method	Molecular Absorption	<b>&amp;</b>
Performance		
I Measuring ranges and change of the ranges	NO, NO2, 0-0.1, 0.2, 0.5ppm	<b>~</b> ~~
manual/automatic	(NO 1.0ppm) change of manual or	change of manual or
	automatic	automatic
2 Repeatability (reproducibility)(3 times, on full scale	within±2%	<del>~~</del>
3 Drift (in 24hr) a. zero (on full scale)	a. within±2%	<b>←</b>
b. span (on full scale)	b. within±2%	+
4 Linearlity (indication error)(on full scale)	within±4%	←
5 Stability of flow rate of sample ambient air to ageing	within±7%/10 days	<b>«</b>
(specified flow rate)		
6 Stability to variation in power source	within±1%	
(variation of $\pm 10\%$ of the rated voltage on full scale)		
7 Error in sampling quantity of absorbing solution	within±4%	←
8 Netrogen-dioxide-collecting rate (NO2 0.1-2ppm)	98% or more	95% or more
9 Output of telemeter	DC 0-1V	DC 0-1V (0.6mA,4-2m
Collection of Sample		
l Sample ambient air inlet		
- Outer piping tube a. materials	a. Teflon	<b>é</b>
b. inner diameter	b. 6am	<b>6</b>
2 Sample ambient air inlet		
- Inner piping tube a. materials	a. Teflon	←
b. inner diameter	b. 4mm	-→
3 Dust filter a. materials	a. Teflon	<i>←</i>
b. outer diameter	b. 47mm	b. 55mm
4 Flow-meter a. type	a. variable area flow-meter	a. float type area
		flow-meter
b. range	b. 50-500ml/min	←
c. measuring precision at measuring	c. 10m1/min	¢
points		
5 Capacity of sample ambient air suction pump	5L/min	<b>4</b>
litrogen dioxide absorber		
Sampling time	56min	←
Flow rate of sample ambient air	300m1/min	200ml/min
Volume of absorbing solution	60m 1	40m1
Absorbing solution a. composition	a. sulphanilic acid 100g	<b>4</b>
(amount of reagent per 20L)	acetic acid 1000ml	←-
	N-1-naphthyl-ethylene-diamine	←
	dihydrochioride lg	
b. method of using solution	b. circulating type	<b>4</b> .
c. capacity of tank	c. 20L	<b></b>
d. compensation for temperature	d. temperature control	<b>4</b> ~~
	at 25°C in the measuring section	

	ana na ana amin' ny faritr'i Angelandi. Ana ana ang ang ang ang ang ang ang ang a		4/6
I4 ave	Туре		APNA-3100
Iten Constitution of absorber		Molecular Absorption	
			torney.
	• • • •		
Colorimeter	· · · · · · · · · · · · · · · · · · ·		
	a. length	a. 35mm	a. 20m
	o, form	b. cylindrical	
	c, capacity	c. 2.8ml	c. 9.2ml
	i. material	d. PVC hard glass (cell window)	d. PVC hard glass
	a. specification	a. LED	a. LED diode: 550nm
	b. power voltage	b. 5V	<ul> <li>b. 1-2V pulse lighting</li> </ul>
	c. life (continous use)	c. more than one year	
	a. specification	a. silicon photo diode	4
	b. voltage	b.	b.
		c. semi-eternal	<b>6</b>
4 Interference filter a		a. 565nm	9
	. meterial	b. métal interference filter	a. b.
)thers	*****		<i>U</i> ,
l Warming-up time		2 hrs	<b>*</b>
2 Adjustment of zero-sp	an a.zero	a. automatic-zero adjustment	
		b. manual-span adjustment	<del>4-</del>
3 Power source voltage		AC 100V ±10%	<b>+</b>
4 Consumption of electr		400VA	300VA
5 Weight		approx. 80kg	approx. 125kg
6 Size		450 x 500 x 1730	550 x 450 x 1650
7 Ambient temperature		5-35℃	0-40°C

					5/6
			`ype	TGAH~203	
	Iten	Measuring Met	hod	Molecular Absorption	
Performance					. · · ·
1 Measuring ranges	and change of the r	anges		NO, NO2, 0-0.1, 0.2, 0.5ppm	
manual/automatic	<b>;</b>			manual or automatic change over switch	
2 Repeatability (r	eproducibility)(3 ti	imes, on full so	ale)	within±2%	
3 Drift (in 24hr)	a. zero (on full sca	ile)		a. within±2%	
	b. span (on full sca	ale)		b. within±2%	
4 Linearlity (indi	cation error)(on ful	1 scale)		within±4%	
5 Stability of flo	w rate of sample am	pient air to age	ing	within±10%/10 days	
(specified flow	rate)				
6 Stability to var	iation in power sour	ce		within±1%	
(variation of $\pm$	10% of the rated vol	tage on full sc	ale)		
	g quantity of absorb			within±4%	
	-collecting rate (NC		1	35% or more	
9 Output of teleme				DC 01V	
	ч. — с. —				
Collection of Sample	· · · · · · · · · · · · · · · · · · ·				<u> </u>
l Sample ambient a	ir inlet				
- Outer piping t	ube a. materials			a. Teflon	
	b. inner diamet	er		D. 6mm	
2 Sample ambient a	ir inlet				
- Inner piping t	ube a. materials			a. Teflon	
	b. inner diamet	er	h	). 4mm	
3 Dust filter	a. materials		1	a. Teflon	
	b. outer diamet	er		3. 45mm	
4 Flow-seter	a, type			. variable area flow-meter	
	b. range			o. 50-600m1/min	:
	c. measuring prec	ision at measur			
	points				
5 Capacity of same	le ambient air sucti	ດທີ່ ສາມສຸດ	2	L/vin	
· · · · · · · · · · · · · · · · · · ·					
itrogen dioxide abs	orber	······			·····
Sampling time			5	6ain 22sec	· .
Flow rate of sam	ple ambient air			00ml/min	
Volume of absorb	-			Com I	
	on a. composition			. sulphanilic acid 100g	
• • • • • •	(amount of reagen	t per 20L)		acetic acid 1000ml	
	,			N-1-naphthyl-ethylene-diamine	
				dihydrochloride lg	
	b. method of using	r solution	ŀ	. once	
	c. capacity of ta			. 20L	,
	d. compensation for			. zoc . isohtermalization in isothermal room	
	u. compensation 1	or compensione	í	. isonici marizacion in isothermal room	· · · · · · · · · · · · · · · · · · ·

Туре TGAH-203 Measuring Method Item Molecular Absorption Constitution of absorber Colorimeter 1 Cell a. length a. 15ma b. form b. cylindrical c. capacity c. 20ml d. material d. hard glass 2 Light source a. specification a. 6V 1A tungsten lamp b. power voltage b. DC 4.5V c. life (continous use) c. more than 3 months 3 Photometry part a. specification a. CdS light conduction cell b. voltage b. DC 2-5.8V c. destined length (continous use) c. semi-eternal 4 Interference filter a, wave length a. 545nm b. meterial b. metal interfence filter Others 1 Warming-up time 2 hrs 2 Adjustment of zero-span a.zero a. automatic-zero adjustment b. span b. manual-span adjustment 3 Power source voltage AC 100V ±10% 4 Consumption of electric power approx. 150VA 5 Weight approx. 110kg 6 Size 525 x 485 x 1415 7 Ambient temperature 0-40°C

# Chapter 6

## IMPLEMENTATION SCHEDULE FOR FLUE GAS MONITORING SYSTEM

#### Chapter 6 Implementation Schedule for Flue Gas Monitoring System

As mentioned in Section 2 of Chapter 4, a few hundreds to a dozen hundreds of regional monitoring stations are needed when Argentina's vast land is considered, but SE's responsibility is monitoring pollutants from thermal power stations.

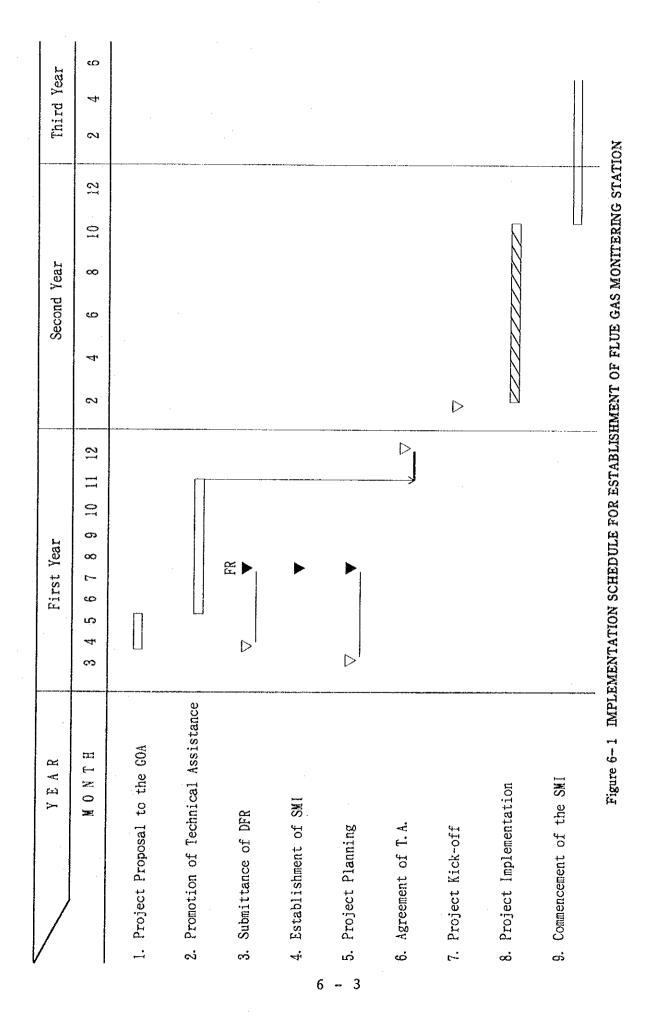
For that reason, six sites segmented by SE's administrative districts and meteorological groupings first should become a base on mid- to long-range terms. When the future plan and roles to be played by the State government have been clarified for other sectors in the country, efficient plans for monitoring stations should be established considering overall plans and pollutant levels of thermal power stations.

Under the circumstances, set-up of stations at three sites in view of SE's administrative districts and meteorological segments demanding eventual installation is defined as Phase 1, and set-up at the other three sites for SE's completion of the proposed initial planning as Phase 2. The four steps given below are desirable for implementation of the plan.

- Step 1 : SE's mid- to long-range plan for electric power is to be used as a base and review is to be made of concrete implementation of environmental preservation policy from administrative and technical viewpoints.
- Step 2 : Based on the above concept, basic plans for mid- to long-range monitoring should be laid out, and the plans should be presented to related organizations both in the country and overseas.
- Step-3 : This is a step where, in line with progress made in Step
  2, monitoring implementation plans are laid out and the
  plans is executed.
- Step-4 : This is a step where the project is actually executed, for which SE's organization is streamlined, and plans for education and training are implemented.

The schedule prepared in line with the above concept is given in Figure 6-1.

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# Chapter 7 COST AND BENEFIT ASSESSEMENT ON AIR POLLUTION CONTROL

#### Chapter 7 Cost and Benefit Assessment on Air Pollution Control

## 7.1 Introduction

In the past decades, the administrative bodies of national government or provincial government in the area, where the issues in relation to the environmental protection are exists, experienced lots of difficulty to find-out the adequate decision, which can maintain desirable environment without disturbing economic development of the nation and/or the area.

In another word, the cost required for the development of a region by construction of infrastructure or development of industries normally increase to the unacceptable level when extremely stringent regulation is imposed on such project for protection of social and natural environment.

Therefore, the administrative bodies must determine the appropriate regulation to be imposed to such development project to maintain the condition of environment in the area without jeopardizing the project. The assessment of required cost and benefit of maintaining environmental standard at desired level should be the basis of such decision making. There have been consistent effort to establish the method to conduct such assessment in the similar way as the benefit analysis on increases in agricultural productivity induced by water resource projects or analysis of road improvement project by time saving and cost saving of vehicles use the improved road.

The history of Cost-Benefit assessment on environmental issues is relatively recent origin and the widely accepted method, which is actual acceptable for decision-making of administrative body, are not established.

However, the benefit analysis based on economic assessment of cost and benefit of environment protection measures expressed in the monetary value have been developed in these years, and in many countries such assessments were conducted and applied to the several practical cases already.

According to a survey conducted by OECD in 1990 on the current status of utilization of "Monetary Valuation Benefit Assessment on Environmental Policy", this method has been used in many cases as shown by Table below;

	SWE	NETH	NOR	FIN	G	UK	AUS	USA	POR	ITA	JAP
National Damage Estimates	-	X	-		X	-	(*)	X	(*)	-	
Specific Pollution Damage										:	
- air	(*)	х	X	*	X	-	-	X	*	-	X
- water	(*)	х	X	Х	х	х	-	X	*	х	-
- soil/land	-	-	-	(*)	х	(*)	-	X	*	х	-
- toxics	(*)	(X)	•	*	-	-	-	· x ·	(*)	-	-
- noise	-	x	X	(*)	Х	(*)	-	(X)	-	X	-
- waste	-	x <sup>1</sup>	-	(*)	-	-	-	X	*	x	-
- oils spils	-	-	· • ·	(X)	-	-	-	X	*	-	-
- other	-	-	-		sea	-	-	-		-	-
					defen	SĄ					
Resource Concerns:											
- wetlands	-	-	-	*	-	х	*	X	-	-	-
- forests	х	-	_2	(X)	X	(X)	х	X	*	x	-
- coastal zones	-	-	-	(X)	-	-	-	X	(X)	x	~
- wildlife/nature	*	-	Х	*	x <sup>3</sup>	(*)	(X)	x	-	х	-
- fish stocks	(*)	-	X	(X)	*	-	-	-	-	-	-
- recycling	-	X		*	-	x	(X)	æ	(*)	x	X
Risks:											
- 'life'	-	-	-	(*)	-	X		x	+	_	
- pollution	-	-	-	*	-	÷_	-	X	_	-	
- ecological	-	-	-	(*)	-	(*)	· _	X	(*)	-	

Table 7-1-1 AREAS OF APPLICATION OF BDE

Source: OECD

1. agricultural waste

2. under way

3. in the near future

Source: Benefit Estimates and Environmental Decision - Making OECD 1992.

OECD Servey also indicated the nature of assessment conducted.

Response from member country of OECD in relation to the way of utilization of "Monetary valuation of Benefit" are analyzed, and results shown as Table bellow:-

Inquiry sent to member country

- \* Stimulation of environmental awareness
- \* Influencing decisions
- \* Identiting what type of decision should be made
- \* Justification of decision

## Table 7-1-2 FUNCTIONS AND LEVELS OF BENEFIT ESTIMATION

Function Level	Simulates Awareness	Influence Decisions	Identify Decisions	Justify Decisions
Policy	Yes	Possible	Unlikely	Unlikely
Regulation	Yes	Likely	Possible	Possible
Project	No	Yes	Likely	Likely

## 7.2 The outline of "Benefit Damage Estimation of Pollution Control with Monetary Valuation" method.

There are several methods have been developed and being used.

In the followings, the method applicable to assess the benefit of air pollution control in monetary value are described:-

## (1) Revealed preference approach

To measure the value of non-market goods, such as the environment, from the market for goods or services which are affected by the changes in the environment. A primary example is real estate transaction which is found to be affected by the quality of air in and around a particular

site. Thus, improvement (deterioration) of the environment in a particular area can be expressed in monetary value by assessing environmental impacts on land price. Another indicator is the cost of travels to be made by people in an area under air pollution to other area with clean air at weekend or vacation.

(2) Stated/expressed preference approach

To estimate the price which an affected party is willing to pay (or receive) for improvement (deterioration) of the environment, on the basis of direct interview with the party. (also called contingent valuation)

(3) Dose-response data linkage

To measure the effect of environmental improvement (deterioration) in monetary value by identifying the relationship in which the effect of unit change in environmental quality can be established.

(4) Others

#### 7.3 Preliminary Assessment of Cost Benefit

(On the introduction of "Air Pollution Control Measure" in Argentine.)

In the following the preliminary Cost-Benefit of Air Pollution Control in Grand Buenos Aires based on some of the methods in preceding chapter are shown. The data and information used in this preliminary assessment, the information in the report of OECD are applied, may not same that of present Grand Buenos Aires but it will be useful to indicate the order of magnitute. (Ref: OECD Environmental Policy Benefits; Monetary Valuation)

7.3.1 Travel Cost Valuation

The method is based on the assumption that, if air pollution

becomes a serious problem in an area, people living in the area travel to other area with clean air at least several times a year, so that the cost of travel is considered to be the monetary value representing the quality of the environment. The method is difficult to estimate how many people actually decide to travel. At the same time, the method is known to produce the results close to those obtained by other contingent valuation method. For the purpose of this study, assuming that 3 million population in Capital Federal (600,000 households) earn US\$20,000/year on average, and approximately one half of them travel twice a year, one week long each, and spend 10% of their income for the trips, the total travel cost is estimated as 600,000 x 2,000 x 0.5 = US\$600 million.

Adding income which would have been earned by the households during the trips, namely 2 weeks,  $1/24 \times 20,000 \times 600,000 \times 0.5 = US$250$  million, a total of US\$850 million is obtained.

7.3.2 Building Corrosion Damage

It is well known that when SOx, NOx and other acidic substances increase in the air due to air pollution, damage to the building surface and corrosion on metal surface progress at an accelerated pace.

According to surveys conducted in the Netherlands, Germany, and the U.S., pollution levels at the 1980s, in the 1983 dollar, are as follows:

<u>EC team est</u>	<u>imat</u>	<u>e 3-14 \$/ca</u>	pta/Year	Level o	Level of Air Pollution			
				1975	1985	1980-1984		
				SOx(µg/M <sup>3</sup> )	SOx	NOx(µg/M <sup>3</sup> )		
Netherlands	8-1	5\$/capt/Y	Amsterdam	34	16	45		
Germany	15	\$/capt/Y	Berlin	95	67	60		
U.S.	28	\$/capt/Y	New York	43	37	65		

If US\$15/capt/year is assumed, 3 million x US\$15 x 10 = US\$450 million are estimated as the total damage to the building for 10

## years in the Buenos Aires area.

## 7.3.3 Impact of Air Pollution on Property Values

Generally, it is difficult to evaluate the effect of air pollution separately from that of other factors which work together to cause environmental dilapidation (e.g., noise and road congestion). The results of studies conducted in the U.S. are summarized below.

Table 7-3-1 IMPACT OF AIR POLLUTION ON PROPERTY VALUES

	Year of: a)Property data b)Pollution measure	Pollution va	in property lue per ase in pollution
St-Louis	1960	Sulfation	0.06-0.10
	1963	Particulates	0.12-0.14
Chicago	1964-67 1964-67	Particulates and sulphation	0.20-0.50
Washington	1970	Particulates	0.05-0.12
	1967-68	Oxidants	0.01-0.02
Toronto-Hamilt	on 1961	Sulfation	0.06-0.12
Philadelphia	1960	Sulfation	0.10
	1969	Particulates	0.12
Pittsburgh	1970 1969	Dustfall and sulphation	0.09-0.15
Los Angeles <sup>1</sup>	1977-78 1977-78	Particulates and oxidants	0.22
is due to if include multicolli Sources: Freen	the form of pollution d has an insignifica	hat part of the elasticity the on that is not included in the ant impact. This problem of scussed in the text. ire et al. (1982) cause above fall)	nat is estimated e analysis, or

Generally, land value falls at a rate equivalent to 1/20 - 1/10 the rate of increase in SOx or suspended particulate. According to the 1991 census the residential area in Capital Federal and Gran Bs As is about  $10^6$  acres. Further assuming that the residential land price is US\$10,000/acre, the total value of residential land is US\$10 billion. If the pollution level increases 100%, the decline in land value is estimated at US\$0.5 ~ 1.0 billion.

## 7.3.4 Conclusion

The benefit of air pollution control estimated in the monetary value result maximum 850 million US\$ annually through travel cost method and minimum 45 million US\$ annually through building corrosion damage.

However, when the damage of cultural heritage such as historical monument in Grand Buenos Aires is considered the building/status damage will be much more significant than the 45 million dollar/Y.

When we take the fall of land value as the benefit of future investment to be made to prevent deterioration of the quality of atmospheric environment in the Grand Buenos Aires, 500~1,000 million US\$ investment will be justified because there is possibility of increase of emission level of pollutant almost two times of present level within 15 years as the rapid economic development, which is normally accompany increase of energy consumption as well, is now envisaged.

# Chapter 8 CONCLUSION AND RECOMMENDATION

#### Chapter 8 Conclusion and Recommendation

(1) Present Atmospheric Pollution

There is no serious air pollution problem in the country caused by the emission from the thermal power plant.

However, part of Buenos Aires suffer air pollution problem which mainly caused by emission from vehicles and minor contribution from industrial emission including from the thermal power plant, and part of Mendoza also suffer sometime deteriorated atmospheric condition particularly by particulate material which caused by several industrial facilities including thermal power plant.

These observation made by the JICA study team indicates that immediate introduction of costly pollution abatement facilities to the thermal power plant are not necessary.

It is strongly felt that the present actions taken by S.E. and E.N.R.E. in relation to the management of atmospheric environment need to be integrated with the activities of the other government agencies and state/municipal government to establish the national air pollution management systems.

The technology, which is proposed in this report and being developed by S.E. and its associated institution for inspection and monitoring the atmospheric environment, should be established immedeately and fully utilized by the other institutions in charge of atmospheric environment management.

(2) Establishing the system for the inspection and monitoring system

Although the present air pollution problem in the country is not serious, the present international concern on the global environment preservation together with the current regional and global movement to have common standard for environment preservation as the basis of free trade and common economic

community necessitate every country to establish national monitoring system to obtain reliable information on the present environmental conditions in the country, which is collected and assessed by the internationally acceptable methods.

It is recommended that the system proposed in this report for the undertaking by SE and being developed by S.E. for monitoring and inspection of the atmospheric management of the thermal power plant should be expanded to the national level through positive cooperation among other related government agencies.

(3) Future environment management for the thermal power plant

As the results of the fundamental restructuring of the economy and industries being proceeded in the country, the future development of energy sector including the electricity generation will be proceeded based on market economy mechanism.

en el des substants de la composition

According to the government economic development program "Growing Argentine 1993-1995", it is now clear that the economy of Argentine will continue rapid development up to next century.

This means the energy requirement including electricity supply will increase rapidly, and the requirement of energy and electricity will be almost doubled from present by AD 2010 as projected by the Ministry of Economy and SE.

Under such circumstance, the supply of clean energy such as hydroelectricity and natural gas might not be sufficient to meet such large additional demand.

This condition may results large scale use of high sulfur fuel oil and coal for requirement of industries and the thermal power plant.

If no adequate measures are taken to avoid the possible air

pollution by the emission from such fuel, there is high possibility of serious air pollution in the area, where heavy industries are locating, as it was experienced by industrialized countries during rapid expansion of manufacturing activities.

Since the future development of majority of manufacturing sector including energy sector are in the hand of private sector, maintaing the harmony between environment preservation and cost saving will be complicated.

It is recommended that well prepared guidance by the related authority should be provided in time for leading the activities of private enterprises to prevent environmental pollution without harming the positive development of the economy of the country, which will be supported by the private enterprises.

The guidance should be prepared based on long range energy supply demand master plan, national plan for siting industrial projects in the country and the national regulatory system to adjust the emission standards to be imposed to the emission sources in accordance with the systematic monitoring system.

## (4) International Cooperation

It is understood that the Government of Argentine is positively participating international activities for global environment preservation program such as Montreal treaty. As the current open trade policy are adopted world wide, any country will have to maintain international standard for protection of global environment as a member of international society.

It is recommended that the technical cooperation between Argentine and Japan in relation to environment preservation shoul be considered positively to develop international cooperation to accelerate global environment preservation activities.

APPENDIX

**APPENDIX 1** 

# List of Equipment Supplied to Argentina

## Appendix 1 List of Equipment Supplied to Argentina

LIST OF EQUPRENT SUPPLIED TO ARGENTINA

0. N0, SO2	62			
05.0	NOX		805	Dust
02, CO, NO, SO2	NOx:Chemiluminescence 02:Zirconia Method		SO2:Infrared Absorption Method(Ratio Method)	Dust:Light Scattering of Near Infrared Ray
2	ିଦ୍ୟ ଦ	100440000000000000000000000000000000000	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	~~~~
-				
ISM	SHIMADZU Co.		SHIMADZU Co.	SHIBATA SCIENTIFIC TECHNOLOCY Ltd.
Gas Analyzer[#S] 2000] Measuring Probe	NOx-O2 Analyzer for Conbustion Exhaust[NOA-7000] Standard Gas 1)NO(240pnm:3.6 liter)	<pre>2)N0(996pn:3.6 liter) 3)O2(0.lppm:3.6 liter) 3)O2(0.lppm:3.6 liter) 4)N2(Research:3.6 liter) Gas Sampling Unit(Pretreatment Set)[CFP-301] Recorder[US-211] Recorder[US-211] l)Recording Paper(3pcs.)[ Nu1008Z40] 2)Ink Set(6cclore)[SA100p:4T55568] 3)Ink Pad[100791] 2)Ink Pad[10070] 2)Ink Pad[100791] 2)Ink Pad[10070] 2)Ink Pad[20020] 2)Ink</pre>	<pre>Infrared Continuous Cas Analyzer[IRA-107] Standard Gas 1)S02(200ppm:3.6 liter) 2)S02(490ppm:3.6 liter) 2)S02(490ppm:3.6 liter) Cas Sampling Unit(Pretreatment Set)[CFP-301]*(1.2-2) Gas Sampling Probe(GSR 100]*(1.2-3) Recorder[US-211]*(1.2-4) 1)Recording Paper(3pcs.)[ Mol008240] 2)Ink Set(6cciors)[SA100p:4755568] 3)Ink Pad[100791]</pre>	Portable Dust Particle Wonitor[AP-710N] Hand-held Computer[EPSON HC-45] Compact Printer[EPSON C-40] Recorder Down Transformer for Computer(HC-45)[300AE] Down Transformer for Printer[SE-100]
1. 1 1. 1-1	1.2 1.2-1	112-9 12-2 12-3 12-4 12-9 12-9 12-9 12-10	1.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2	11-4-4- -4-4-1 -4-4-2-1
	Cas Analyzer[MS] 2000] 2 Measuring Probe	<sup>1</sup> Measuring Probe     2     02, CO, NO, SO2 <sup>1</sup> Measuring Probe     NOx-O2 Analyzer for Conbustion Exhaust[NOA-7000]     SHIMADZU Co.     2     NOx:Chemiluminescence <sup>1</sup> Standard Gas     1)NO(240pon:3.6 iiter)     9     02:Zirconia Method	Gas Analyzer (Ks) 2000         (Ks)         2         02, CO, NO, SO2           Measuring Probe         (Nor-O2 Analyzer for Conbustion Exhaust(NOA-7000)         SHIMADCU Co.         2         (Nor.Chemiluminescence           Nor-O2 Analyzer for Conbustion Exhaust(NOA-7000)         SHIMADCU Co.         2         NOx:Chemiluminescence           Standard Gas         Standard Gas         (Nor.Colognen: 6 liter)         2         02.CO, NO, SO2           NONOGROPHICAL Data         6 liter)         2         02.Co, NO, SO2         2           Standard Gas         1)NOCS0pen: 6 liter)         2         02.Co, NO, SO2           2)NOC90pm: 5 liter)         3)O2(0 lpm: 3.6 liter)         2         02.Co, NO, SO2           3)O2(0 lpm: 3.6 liter)         3)O2(0 lpm: 3.6 liter)         2         2           4)NOC80pan: 5 liter)         3)O2(0 lpm: 3.6 liter)         2         2           2)NOC90pan: 5 liter)         3)O2(0 lpm: 3.6 liter)         2         2           3)NOC80pack         5 liter)         3         2         2           4         4         4         4         4           5         5         2         2         2           1)Neconduit         PaperCasses) (NOP (APOS)         2         2         2	Gas Analyzer [K] 2000]     KSI     2     02. CO. NG. SC2       Kasarurag Probe     KN-C& halyzer [K] 2000]     SHMADZI Co.     2     NOX: Cheniluainescence       KN-C& halyzer for Convection Exhaust (NOA-7000]     SHMADZI Co.     2     NOX: Cheniluainescence       Standard fast     000(340pents 6 liter)     2     NOX: Cheniluainescence       2)NOC4040pent 56 liter)     2)NOC4040pent 56 liter)     2     NOX: Cheniluainescence       2)NOC4040pent 56 liter)     2)NOC4040pent 56 liter)     2     2     NOX: Cheniluainescence       2)NOC4040pent 56 liter)     2)NOC4040pent 56 liter)     2     2     2       2)NOC4040pent 56 liter)     4     4     4       2)NOC4040pent 56 liter)     4     4     4       2)NOC4040pent 56 liter)     5     2     2     2       2)NOC4040pent 56 liter)     5     1     2     2       2)NOC4040pent 56 liter)     5     2     2     2       2)Not 5655630     3     3     2     2     2       2)Not 5656700     3     3     2

ITEN No.	EQUIPMENT [MODEL]	MANUFACTURE	QUANTITY (set)	SPECIFICATION	User
1. 4-6 1. 4-7 1. 2-8	Ribon Cassette Roll Paper Paper for Recorder(2 × 3pcs.)[E9653BQ]		<u></u> α α α		
1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5	Automatic Equal-Velocity Flue Gas Suction Device [DUSTAC SAMPLER:ESA-302CT-20N] Wet Gas Weter [Model W-NK De-5A] Moisture Absorption Tube Set[EW-32A] Thinkle Case SerfFor-A	SHIBATA SCIENTIFIC TECHNOLOCY Ltd.	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Practical Equal-Velocity Suction Quantity of Flow :1.0-50 liter/min	Dust
1.5-4-	Gas Sampling Tube [Sampling Tube 1,000mm[ES-302S] 2)Connector Pipe[ES-LS-10] 3)Connector Pipe[EP-1] 4)Pitot Tube Western-type 8 φ[EWK-1S] 5)Pitot Tube L-type 8 φ[EL-IS]	OKANO WORKS Ltd.	* 21 22 02 04 04 04 04		
1.5-5 1.5-5 1.5-7 1.5-7 1.5-7 1.5-5	Sampling Tube for Moisture with Heater Dust Collecting Tube Suction Nozzle Set[EP-25N] Sliy Flange(for 48, SS) Handy Vise(100mm) V-Thermonomm		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		
	A litermocouple(3.2 $\phi \times 1, 100 \text{ mm}$ )[ESK-10] 2)K-Thermocouple(3.2 $\phi \times 3, 100 \text{ mm}$ )[ESK-30] Holder for Clindrical Filter-Paper[ESP-25H] Packing of Holder for Clindrical Filter-Paper(3pcs.) Ribbon Heater for Clindrical Filter-Paper(3pcs.) Tool & Tool Box Recording Paper(Roll Paper)[NR-440] Ink Ribbon(Ribbon Cassette)[ERC-05] Vacuum Hose(6 $\phi \times 18 \text{mm} \times 10 \text{m})$ Pretreatment Set Cooling Water Bath with Clumps		04000004 ~00		
	· · ·		· · · · · · · · · · · · · · · · · · ·		<b>.</b>

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TO ARGENTINA
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PL IED
LIST OF EQUPRENT SUF
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LIST

						كالأشادي مجازمه فيتبعيه يستع	
User	Ras	NH CUS	Air Sampler ambient air	XOX	<u>s02</u>	Dust	
SPECIFICATION	Dust Particle Concentration : β-Ray Absorption	500-1,200 liter/min with Automatic Constant Flow	Double Diaphragm System Air Sampler	NOx: Chemiluminescence	SO2:Ultraviolet Fluorescence	Dust: <i>B</i> -Ray Absorption	
	13	<u> </u>		· · ·			
	$   \begin{array}{c}     12 \\     14 \\     12 \\   $	202 201 400 70 70 70 70 70 70 70 70 70 70 70 70 7	0 10 10 10 10 10 10 10 10 10 10 10 10 10	22 6 1	1	<b>***1</b>	
QUANTITY (set)							
NANUFACTURE	SHIBATA SCIENTIFIC TECHNOLOCY Ltd.	SHIBATA SCIENTIFIC TECHNOLOGY Ltd. Argentina:	SHIBATA SCIENTIFIC TECHNOLOGY Ltd. Argentina: Argentina: Argentina:	SHIBATA S. T. Argentina: HORIBA Ltd.	HORIBA Ltd.	HORIBA Ltd.	
	Air Pollution Wonitoring Analyzer β-Ray Attenuation Wass Wonitor[BAM-102S] Filter Paper Recording Paper for BAM-102S Tape Cores Ink Ribbon Sampling Tube( φ14×10.5mm.5m)	High Volume Air Sampler[HYC-1000N] Filter Paper(50pcs., 203 × 253mm) Particle Separator Filter Paper(50pcs., 126 × 166mm_with slit) Motor Brush for Repair Paint for Maintenance Carrier(300kg Use) Orifice Meter Defice Meter Electric Cord with Socket(20m)	Stand Sampler[S-601] SPC Midget 1mpinger G-1 Set(10pcs.) Dry Battery(200pcs.) AC/DC Adaptor[Wodel:1462](1.000mA-18W) Electric Cord(2m) Plastic Funnel Three-way Socket	Impinger Set(6pcs.)[8003-2] Shelter (for Stand Sampler) Ambient NOX Wonitor[APNA-350E] UV-Lamp	Monitor[APSA-350E]	Wonitor[APDA-350E] Pump [ULVAC] Per (for Ambient SPW Monitor)	
ITEN No.	6 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	9 2:4 10 2:5 11 2:6	12 2.7	13 2.8	

Chemical Reagent for Salzama Method     Japan WAG       11     Chemical Reagent for Salzama Method     Japan WAG       12     Chemical Reagent for Salzama Method     Japan WAG       13     Acetic Acid     Argentina: WERK       14     Sulfanilic Acid     Japan WAG       15     Chemical Reagent for Salzama Method     Japan WAG       16     Acetic Acid     Argentina: WERK       16     Potassium Pernanganate     Japan WAG       17     Chemical Reagent for Pararosaniline Method     Japan WAG       18     Chemical Reagent for Pararosaniline Method     Japan WAG       2008     Solium Britrie     Jopan WAG       21     Mercury (II) Chloride     Japan WAG       22     Chemical Reagent for Fararosaniline Method     Japan WAG       23     Chemical Reagent for Acid Disolum Salt     Japan WAG       25     Ethylenoidanine Fordal     Japan WAG       25     Ethylenoidanine Fordal     Japan WAG       25     Solium Thiosulfate Solution     Japan WAG       25     Solium Thiosulfate Solution     Japan WAG       26     Potassium Idvicoxie     Japan WAG       27     Solium Thiosulfate Solution     Japan WAG       28     Solium Thiosulfate Solution     Japan WAG       29     Solium Thiosulfate	ITEN No.	EQUIPMENT [MODEL]	MANUFACTURE			SPECIFICATION		User
Chronical Resent for Salzani Method         Depention:         Notice Addition (Addition (Addit	3.	12		1. 1984				
WI. Montry leithy						NO2:Ambient Air	XON	
Sulfarilic Acid     Sulfarilic Acid     Jagan: WEB     Jogan: WEB     Jogan: WEB     Jogan: WEB     Jogan: WEB     Jogan: WE     Jogan: WE     Jogan: WE     Jogan: WE     Jogan: WE     Jogan: WEB     Jogan: W	: 1. ]	N-1-Naphtylethylenediamine	Japan: WAKO	$lg \times 10 \times$	.0			
Netric Acid         Argentina: MKA         250g ×         1         2         5           Petassian Permanganate         Repetition: MEX         500g ×         1         2         5           Petassian Permanganate         Repetition: MEX         500g ×         1         2         5           Petassian Permanganate         Repetition: MEX         500g ×         2         5         5           Remain Permanganate         Repetition: MEX         500g ×         3         2         5           Presonant Line Method         Repetition: MEX         500g ×         3         2         7           Presonant Line Method         Repetition: MEX         500g ×         3         2         7           Presonant Line Method         Repetition: MEX         500g ×         3         2         7           Presonant Line Method         Repetition: MEX         500g ×         3         2         7           Mercurconalition Method         Repetition: MEX         500g ×         3         2         7           Solution         Repetition: MEX         500g ×         3         2         7           Solution         Repetition: MEX         500g ×         3         2         7	. 1. 2	Sulfanilic Acid	Japan: WAKO	500g ×	 ני לנו			
Control for framework         Argentina: HER         Nouser of the framework         Nouse of the framework         Nouser of the framework <td>с -</td> <td></td> <td>Argentina: MEKK</td> <td>250g X</td> <td></td> <td>1</td> <td></td> <td></td>	с -		Argentina: MEKK	250g X		1		
Potassium functionPotassium functionSocied fragment for fractrossentiline fectodSocied fragment for fractrossentiline fractrossentiline for fractross	0 ×	Acerto Acta Sodium Nitvita	Argentina:			 Ω		
Chemical Regent for Pararosaniline Method         Japan: MKO         500 x         3         S02: Ambient Air           """"         """"         """"         """"         """"         """""         """"""         """"""""""""""""""""""""""""""""""""	.1.5	Potassium Permanganate	Japan:	500g X	3 m			
Mercury ( T) Chloride         Japan: MAO         S00g ×         3         3         4           "	2	Chemical Reagent for Pararosaniline Method				SOP-Ambient Air	808	
<pre>/************************************</pre>	ຸ	Mercury (II) Chloride	Japan: WAKO	$500g \times$	e		) 	
Potassium ChlorideJapan: WAKO500g x8Ethylendiamine Tetra Acetic Acid Disoium SaltJapan: WAKO55g x2Paracosaniline NytrochlorideNine Tetra Acetic Acid Disoium SaltJapan: WAKO55g x2Paracosaniline NytrochlorideNine NytrochlorideNine Nytrochloride1000ml x2Pyrosolium ThiosulfateNine NytrochlorideNine Nytrochloride32.5Sodium ThiosulfateNine NytrochlorideNine Nytrochloride32.5Sodium ThiosulfateNine NytrochlorideJapan: WAKO500g x32.5Sodium ThiosulfateNine NytrochlorideNine Nytrochloride32.5Sodium ThiosulfateNine NytrochlorideJapan: WAKO500g x1Sodium ThiosulfateNine NytrochlorideJapan: WAKO500g x1Sodium ThiosulfateNine NytrochlorideJapan: WAKO1000ml x1Sodium ThiosulfateNine Nitrin NytrochlorideJapan: WAKO11None Sodium NotrochlorideNine Nitrine1000ml x11None Sodium NotrochlorideNine Nitrine1000ml x11Nonuble StarchJapan: WAKO1000ml x111Nonuble StarchJapan: WAKO1000ml x111Nonuble StarchNitrant Notextina:1,000ml x11Nonuble StarchNitrant Notextina:1,000ml x11Nonuble StarchNitrant NotextideNitrant Notextina:11 <td></td> <td></td> <td>Argentina: MERK</td> <td><math>250g \times</math></td> <td>ي ما</td> <td></td> <td></td> <td></td>			Argentina: MERK	$250g \times$	ي ما			
Ethylendiamine Tetra Acetic Acid Disoium SaltJapan: MANO255 × 2Paracrosaniline HydrochlorideNarcontina:1,000ml ×2Paracrosaniline HydrochlorideArgentina:1,000ml ×2Paracrosaniline Hydrogen SulfiteArgentina:1,000ml ×2Formaldehyde (formalin)Argentina:1,000ml ×2Formaldehyde (formalin)Argentina:1,000ml ×2Formaldehyde (formalin)Argentina:1,000ml ×2Sodium Hydrogen SulfateSodium Thiosulfate SolutionJapan: MANO500g ×3N/10 Sodium Thiosulfate SolutionJapan: MANO500g ×1N/10 Sodium Thiosulfate SolutionJapan: MANO500g ×1Sodium ThiosulfateJapan: MANO500g ×1Potassium IodineJapan: MANO500g ×1Potassium IodineJapan: MANO1,000ml ×1Potassium IodineJapan: MANO1,000ml ×1Nrsphoric AcidArgentina:1,000ml ×1*Argentina:1,000ml ×1*Argentina:1,000ml ×1*Argentina:1,000ml ×1*Argentina:1,000ml ×1*Argentina:1,000ml ×1*Argentina:1,000ml ×1**1Argentina:**11**1**1**1**1 <trr>*</trr>	.2.2	Potassium Chloride	Japan: WAKO	500g ×	<b>က</b>			
Pararosaniline Hydrochloride     Japan WAMO     10g×     10       Hydrochloric Acid     Hydrochloria     1.000ml×     2       Hydrochloric Acid     Argentina:     1.000ml×     2       Sodium Hydrogen Sulfite     Argentina:     500g×     3     2.5       Sodium Thiosulfate Solution     Argentina:     500g×     3     2.5       Sodium Thiosulfate Solution     Argentina:     500g×     3     2.5       Sodium Thiosulfate Solution     Japan:WAKO     500g×     1       Sodium Thiosulfate Solution     Japan:WAKO     500g×     1       Solium Thiosulfate Solution     Japan:WAKO     500g×     1       N/10 Sadium Thiosulfate Solution     Japan:WAKO     500g×     1       Solium Thiosulfate     Japan:WAKO     1000ml×     1       Potassium Jodine     Japan:WAKO     1000ml×     1       Sulfanical Reagent for Zn-NEDA Method     Japan:WAKO     1.000ml×     1       N     Japan:WAKO     1.000ml×     1     1       N     Japan:WAKO     1.000ml×     1     1       N     Magentina:     1.000ml×     1     1       N     Solutur Acid     1.000ml×     1     1       N     Sulfuric Acid     Solutur Acid     1	. 2. 3		Japan: WAKO	25g ×	5			
Bydrochloric AcidMydrochloric AcidMydrochloric AcidMydrochloric AcidMydrochloric AcidMydrochloric AcidMydrochloric Solg × 127Formaldebyde (Formalin)Acgentina:1,000ml × 2222Formaldebyde (Formalin)Mydrochloric Solg × 1132.5IodineN/10 Sodium Thiosulfate SolutionJapan:WAKO500g × 11Sodium Thiosulfate SolutionJapan:WAKO500g × 11Sodium Thiosulfate SolutionJapan:WAKO500g × 11Sodium Thiosulfate SolutionJapan:WAKO500g × 11Sodium Thiosulfate SolutionJapan:WAKO500g × 11Solubie StarchJapan:WAKO500g × 11Solubie StarchJapan:WAKO1,000ml × 11"Mrgentina:1,000ml × 11"Mrgentina:1,000ml × 11"Japan:WAKO1,000ml × 11"Japan:WAKO1,000ml × 11""Japan:WAKO1,000ml × 1""Japan:WAKO1,000ml × 1""Japan:WAKO1,000ml × 1"""Japan:WAKO1,000ml × 1""Japan:WAKO1,000ml × 1""""""""""""""""""""""""""""""	.2.4	Pararosaniline Hydrochloride	Japan: WAKO	10g×	10			
Formaldehyde (Formalin)Argentina:1,000ml ×2Sodium Hydrogen SulfiteSodium Thiosulfate SolutionJapan: WAKO500g ×32.5Sodium Thiosulfate SolutionJapan: WAKO500g ×32.5N10 Sodium Thiosulfate SolutionJapan: WAKO500g ×1Solium Thiosulfate SolutionJapan: WAKO500g ×1Sulfamic AcidArgentina:1.000g ×1Potassium JodineJapan: WAKO500g ×1Sulfamic AcidArgentina:1.000ml ×1Potassium JodineJapan: WAKO500g ×1Nuclue StarchArgentina:1.000ml ×1Potassium JodineJapan: WAKO500g ×1Nuclue StarchArgentina:1.000ml ×1Potassium JodineJapan: WAKO500g ×1Nuclue StarchArgentina:1.000ml ×1Nuclue StarchArgentina:1.000ml ×1Nuclue StarchArgentina:1.000ml ×1NucluandeNuclue StarchArgentina:500g ×1Nuclue StarchSolution HydroxideArgentina:500g ×1NucluandeNuclue StarchArgentina:500g ×1Nuclue StarchSolution HydroxideNuclue Starch1Nuclue StarchSolut NitriteSolog ×1Nuclue StarchNuclue StarchSolog ×1Nuclue StarchNuclue StarchNuclue Starch1Nuclue StarchNuclue Starch	. 2. 5	Hydrochloric Acid	Argentina:	1,000ml ×		7		
Sodium Hydrogen SulfiteArgentina:500g ×1IodineIodineJapan: WAKO500g ×3N/10Sodium Thiosulfate SolutionJapan: WAKO500g ×3N/10Sodium Thiosulfate SolutionArgentina:1,000g ×1Sodium Thiosulfate SolutionArgentina:1,000g ×1Sulfamic AcidJapan: WAKO500g ×1Sotuble StarchJapan: WAKO500g ×1Sotuble StarchJapan: WAKO500g ×1Sotuble StarchArgentina:1,000ml ×1NArgentina:1,000ml ×1NArgentina:1,000ml ×1NArgentina:1,000ml ×1NArgentina:1,000ml ×1NArgentina:1,000ml ×1NArgentina:500g × <t< td=""><td>2.6</td><td>Formaldehyde (Formalin)</td><td>Argentina:</td><td>1, 000ml ×</td><td></td><td></td><td></td><td></td></t<>	2.6	Formaldehyde (Formalin)	Argentina:	1, 000ml ×				
IodineIodineJapan:WAKO500g×32.5N/10Sodium Thiosulfate SolutionN/10Sodium Thiosulfate Solution32.5Sodium ThiosulfateSolutionHigentina:1,000g×1Sulfanic AcidJapan:WAKO500g×132.5Sulfanic AcidJapan:WAKO500g×11Phosphoric AcidJapan:WAKO500g×11Stuble StarchJapan:WAKO500g×11Chemical Reagent for Zn-NEDA MethodJapan:WAKO1,000ml×1NMigentina:1,000ml×11NArgentina:1,000ml×11NMigentina:1,000ml×11NMigentina:500g×11NMigentina:500g×11NMigentina:500g×11NMigentina:Migentina:500g×1NNMigentina:500g×21NNNNN500g×1NNNN500g×1NNNNN500g×1NNNNN500g×1NNNNN500g×1NNNNN500g×1NNNNN500g×1NNNNNNNN	. 2. 7	Sodium Nydrogen Sulfite	Argentina:	$500g \times$	-			
N/10Sodium Thiosulfate SolutionJapan: MAKO500ml ×32.5Sodium ThiosulfateSodium Thiosulfate260 ×222Sulfamic AcidArgentina:1.000g ×11Potassium IodineJapan: WAKO500g ×11Sotuble StarchJapan: WAKO500g ×11Phosphoric AcidJapan: WAKO1.000ml ×11"Mrgentina:Japan: WAKO1.000ml ×1"Mrgentina:Japan: WAKO1.000ml ×1"Mrgentina:Mrgentina:500g ×1"Mrgentina:Mrgentina:500g ×1"Mrgentina:Mrgentina:500g ×1"Mrgentina:Mrgentina:500g ×1"Mrgentina:Mrgentina:500g ×1"Mrgentina:Mrgentina:500g ×1"Mrgentina:Mrgentina:500g ×1"Mrgentina:Mrgentina:500g ×1"Mrgentina: <td>5 8 . 7</td> <td>lodine</td> <td>Japan: WAKO</td> <td>500g ×</td> <td></td> <td></td> <td></td> <td></td>	5 8 . 7	lodine	Japan: WAKO	500g ×				
Socium IntosultateArgentina:250g ×2Sulfamic AcidNagentina:1,000g ×1Sulfamic AcidJapan:WAKO500g ×1Rotuble StarchJapan:WAKO500g ×1Rotuble StarchJapan:WAKO500g ×1Rotuble StarchJapan:WAKO1,000ml ×1Nothic StarchJapan:WAKO1,000ml ×1Nothic StarchJapan:WAKO1,000ml ×1NKrgentina:1,000ml ×1NNuffuric AcidArgentina:1,000ml ×1Nuffuric AcidArgentina:1,000ml ×1SulfanilamideArgentina:1,000ml ×1Rydrochloric Acid*(3.2.5)Argentina:500g ×1Sodium HotoxideArgentina:500g ×1Sodium HotoxideArgentina:500g ×1Nitor Acid*(3.1.3)Japan:WAKO100g ×2N-1-Naphtylethylenediamine*(3.1.1)Argentina:500g ×1Potassium NitriteSodium Nitrite500g ×1Sodium NitriteSodium Nitrite500g ×1	6 	N/10 Sodium Thiosulfate Solution	Japan: WAKO	200#1 X		2		
Sultanto AcidArgentina:1,000g ×1Potassium lodinePotassium lodineJapan:WAKO500g ×1Rouble StarchJapan:WAKO1000ml ×1Mcgentina:Japan:WAKO1,000ml ×1Mcgentina:1,000ml ×1Mcgentina:1,000ml ×1Mcgentina:1,000ml ×1Mcgentina:1,000ml ×1McfanilamideArgentina:1,000ml ×1HydroxideArgentina:500g ×1Nulfuric AcidArgentina:500g ×1NulfurinamideArgentina:500g ×1NulfurinamideArgentina:500g ×1NulfurinamideArgentina:500g ×1NulfunilamideArgentina:500g ×1NulfurinamideArgentina:500g ×1NulfurinamideArgentina:500g ×1NulfuriteArgentina:500g ×1Argentina:Argentina:500g ×1Argentina:Argentina:500g ×1Argentina:Argentina:500g ×1Argentina:Argentina:500g ×1Argentina:Argentina:500g ×1Argentina:Argentina:500g ×1Argentina:Argentina:500g ×1Argentina:Argentina:500g ×1Argentina:Argentina:500g ×1ArgentinaArgentina:500g ×1Argentina:<	л с Г Г		Argentina:	× 20c2	7			
rotassium footneJapan: MAO500g ×1%frocassium footnefapan: WAKO500g ×1%froshoric Acidfrom: WAKO1,000ml ×1%froshoric Acidfrom: WAKO1,000ml ×1%from: WAKO1,000ml ×1%from: Flantianis1,000ml ×1%from: Flantianis1,000ml ×1%from: Flantianidefrom: Flantianis1,000ml ×1%from: Flantianidefrom: Flantianis500g ×1%from: Flantianisfrom: Flantianisfrom: Flantianis1%from: Flantianisfrom: Flantianisfrom: Flantia	01.2.	Sullaric Acid	Argentina:	1, 000g ×				
Socuble StarchJapen: MAO500g ×1""Japen: WAKO1,000ml ×1""Argentina:1,000ml ×1"Nulfuric AcidArgentina:1,000ml ×1Chemical Reagent for Zn-NEDA MethodArgentina:1,000ml ×1Sulfuric AcidSulfuric AcidArgentina:1,000ml ×1Sulfuric AcidArgentina:500g ×1Nuftrochloric Acid*(3.2.5)Argentina:500g ×2Nuftrochloric Acid*(3.1.3)Argentina:500g ×2Sodium AcetateArgentina:500g ×2Acetic Acid*(3.1.3)Japan:500g ×1""N-1-Kaphtylethylenediamine*(3.1.1)Argentina:500g ×1Potassium Nitrate"Sodium Nitrite*(3.1.4)500g ×1	11.2	rotassium logine	Japan: WAKU	2006 X				
Phosphoric AcidJapan: MAO1,000ml ×1""Argentina:1,000ml ×1"Sulfuric AcidArgentina:1,000ml ×1SulfanilamideArgentina:500g ×1NuffanilamideArgentina:500g ×1NuffanilamideArgentina:500g ×1NuffanilamideArgentina:500g ×1NuffanilamideArgentina:500g ×2NuffanilamideArgentina:500g ×2NuffanilamideArgentina:500g ×2"Argentina:500g ×1"""Argentina:""N-1-Kaphtylethylenediamine*(3.1.1)1Potassium Nitrate"500g ×1Potassium Nitrite*(3.1.4)Sodium Nitrite*(3.1.4)1	7. 17	Sotuble Starch	Japan: WAKO	200g ×				
<pre>// // // // // // // // // // // // //</pre>	. 2. 13	Phosphoric Acid	Japan: WAKO	$1,000 \text{ml} \times$		<b>beens d</b> de		
Chemical Reagent for Zn-NEDA MethodArgentina:1.000ml ×1Sulfuric AcidSulfuric AcidArgentina:1.000ml ×1SulfanilamideNutrochloric Acid*(3.2.5)Argentina:500g ×1Hydrochloric Acid*(3.2.5)Argentina:MERK250g ×21Sodium HydroxideArgentina:MERK250g ×21Sodium HydroxideArgentina:MERK250g ×21Sodium HydroxideArgentina:MERK250g ×21Sodium NitrateArgentina:MERK500g ×11Potassium Nitrite*(3.1.4)Sodium Nitrite*(3.1.4)500g ×1			Argentina:	11, 000ml ×	T			
Sulfuric AcidArgentina:1.000ml ×1SulfanilamideHydrochloric Acid*(3.2.5)Argentina:500g ×1Hydrochloric Acid*(3.2.5)Argentina: MERK250g ×21Sodium HydroxideArgentina: MERK250g ×21Acetic Acid*(3.1.3)Japan: WAXO100g ×22"N-1-Naphtylethylenediamine*(3.1.1)Argentina:500g ×1Potassium NitratePotassium Nitrite*(3.1.4)Sodium Nitrite*(3.1.4)-	73°	Chemical Reagent for Zn-NEDA Method				NOx:Flue Gas	<u>., -</u>	
SulfanilamideArgentina:500g ×Hydrochloric Acid*(3.2.5)Hydrochloric Acid*(3.2.5)Argentina:MERKSodium HydroxideArgentina:MERK250g ×Sodium HydroxideArgentina:MERK250g ×Solium HydroxideArgentina:MERK250g ×Solium HydroxideArgentina:MERK250g ×Solium HydroxideArgentina:MERK250g ×Acetic Acid*(3.1.3)Japan:WAXO100g ×Zinc, PowderArgentina:500g ×"Potassium NitratePotassium NitriteSodium Nitrite*(3.1.4)Sodium Nitrite*(3.1.4)	. 2 1	Sulfuric Acid	Argentína:	$1.000 \pm 1 \times$	-1			
Hydrochloric Acid*(3.2.5)Hydrochloric Acid*(3.2.5)Sodium Acetate TrihydateArgentina:MERK 250g ×Sodium HydroxideArgentina:MERK 250g ×Solium HydroxideJapan:WAXO 100g ×Acetic Acid*(3.1.3)Japan:WAXO 100g ×Zinc, PowderArgentina:"Argentina:"Argentina:Solium NitratePotassium Nitrite*(3.1.4)Solium Nitrite*(3.1.4)Solium Nitrite*(3.1.4)	2.2	Sulfanilamide	Argentina:	500z ×	• `~			
Sodium Acetate Trihydate Argentina:MERK 250g× Sodium Hydroxide Argentina:MERK 250g× Acetic Acid*(3.1.3) Japan:WERK 250g× Zinc, Powder Argentina:MERK 250g× N-1-Naphtylethylenediamine*(3.1.1) Argentina: 500g× Potassium Nitrate Potassium Nitrite Song× Sodium Nitrite*(3.1.4)	. 2. 3	Hydrochleric Acid*(3.2.5)		1				
Sodium Hydroxide Acetic Acid*(3.1.3) Zinc, Powder	. 2. 4	Sodium Acetate Trihydate	Argentina:MERK	250g ×	2		<u> </u>	
Acetic Acid*(3.1.3) Zinc, Powder " N-1-Naphtylethylendiamine*(3.1.1) Potassium Nitrate Potassium Nitrite Sodium Nitrite*(3.1.4)	. 2. 5	Sodium Hydroxide	Argentina: MERK	250g ×	1 01	4	<u> </u>	
Zinc, Powder // Argentina: 500g× N-1-Kaphtylethylenediamine*(3.1.1) Potassium Nitrate Potassium Nitrite Sodium Nitrite*(3.1.4)	.2.6	Acetic Acid*(3,1.3)	-		1		<u> </u>	
<pre>// // // // // // // // // // // // //</pre>	2.7	Zinc, Powder	Japan: WAKO	$100g \times$	2			
N-1-Kaphtylethylendiamine*(3.1.1) Potassium Nitrate Potassium Nitrite Sodium Nitrite*(3.1.4)			Argentina:	$500g \times$	<b>p</b> 4			
Potassium Nitrate Argentina:MERK 500g× Potassium Nitrite Sodium Nitrite*(3.1.4)	2.8		-	İ				
Potassium Nitrite Sodium Nitrite*(3.1.4)	3.2.9		Argentina:MERK	500g ×	1		<u></u>	
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LIST OF EQUPMENT SUPPLIED TO ARGENTINA

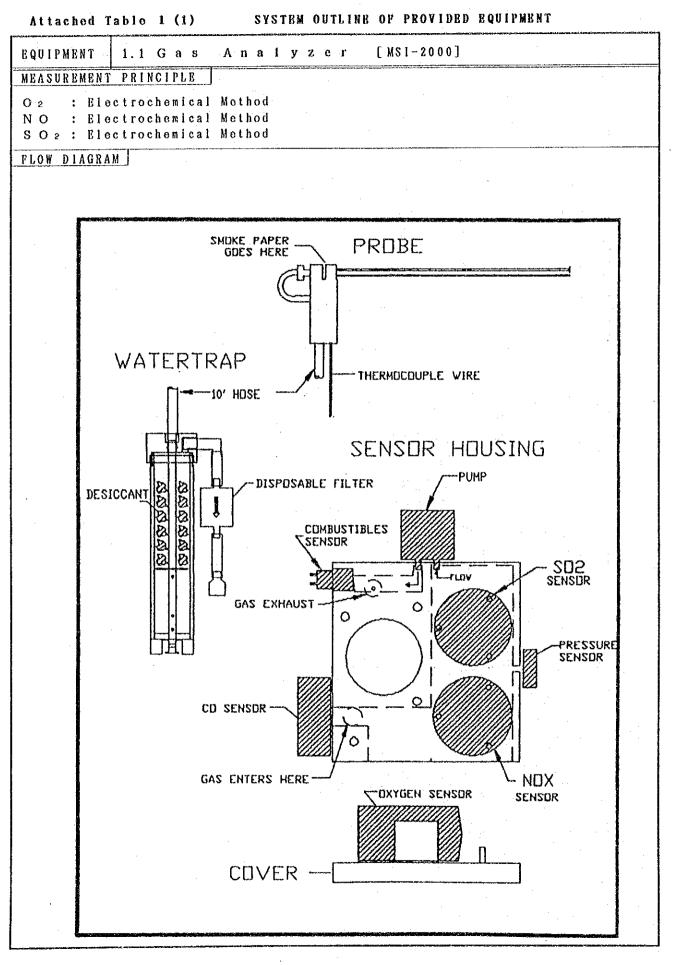
LIST OF EQUEMENT SUPPLIED TO ARGENTINA	
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201.adv     201.adv     5       0.3.21     Construction State     SILMA     1       0.3.22     Construction State     SILMA     1       0.3.22     Construction State     SILMA     5       0.3.23     Construction State     SILMA     5       0.3.24     Pressure Gas Instrict Set Traps     SILMA     6       0.3.25     Construction State     SILMA     6       0.3.24     Pressure Gas Instrict Set Traps     SILMA     6       0.3.25     Construction State     SILMA     6       0.3.26     Pressure Gas Instrict Set Traps     SILMA     6       0.3.26     France     SILMA     6       0.3.27     Pressure Gas Instrict Set Traps     SILMA     6       0.3.27     Pressore Set     SILMA     5       0.3.28     Pressore Set     SILMA     5       0.3.29     Pressore Set     SILMA     5       0.3.30     Pressore Set     SILMA     5       0.3.4     Pressore Set     SILMA     5       0.3.5     Pressore Set     SILMA     5       0.3.6     Pressore Set     SILMA     5       0.3.7     Pressore Set     SILMA     5       0.3.8     Pressore Set     SILMA	ITEN No.	EQUIPMENT [MODEL]	MANUFACTURE	QUANTITY		SPECIFICATION	lser
Rilbert     Statistications Set     Stiller       Rilbert     Statistications Set     Stiller       Gas Werer(Wer Type)     Stiller     Stiller       Gas Werer(Wer Type)     Stiller     Stiller       Gas Werer(Wer Type)     Stiller     Stiller       Researe Gas Merce(TA-3000)     Max     Stiller       Ristor     Stiller     Stiller     Stiller       Plag Set     Construction Rainer(TATIN)     Stiller     Stiller       Stiller     Stiller     Stiller     Stiller       Distart     Stiller     Stiller     Stiller       Stiller     Stiller     Stiller     Stiller       Distart     Stiller     Stiller     Stiller       Stiller     Stiller     Stiller     Stiller       Stiller     Stiller     Stiller     Stiller       Stiller     Stiller     Stiller     Stiller       Stiller     Stiller     Stiller     Stiller <td></td> <td>2)Blade</td> <td>SHIBATA</td> <td></td> <td>-</td> <td></td> <td></td>		2)Blade	SHIBATA		-		
Answere     Silkin     5       Cast Nations Bortic Sci.     Silkin     5       Cast Nations Bortic Sci.     Silkin     5       Cast Nations Bortic Sci.     Silkin     5       Fleeterric Balance(FY-3000)     MD     2       Silkin     Silkin     10       Silkin     Silkin     10       Silkin     Silkin     10       State Cor Ruipment     Silkin     10 <td>0 0 01</td> <td>3) Maintenance Set</td> <td>SHIBATA</td> <td></td> <td></td> <td></td> <td></td>	0 0 01	3) Maintenance Set	SHIBATA				
Gas Wathing Nutle Set     SHIBATA       Filectronic Balance[Fx.3000]     SHIBATA       Filectronic Balance[Fx.3000]     SHIBATA       Filectronic Balance[Fx.3000]     SHIBATA       Stidac     Thersformer       Filestronic Balance[Fx.3000]     AND       Stidac     Stidac       Stidac     SHIBATA       Storage Case for Equipment     SHIBATA       Storage Case     SHIBATA       Store     SHIBATA       SSHIBATA     SHIBATA       SSHIBATA     SHIBATA       SSHIBATA     SHIBATA       SSHIBATA     SHIBATA	2 2 2 2	FLOW MECCT[47-02] Cas Matar(Mat Tura)	SHIBATA				
Pressure Gas Hose(f × 21m, 1a)       SHIBATA       2         Stidac       Transformer       ALD       2         Stidac       Stidac       SHIBATA       2         Furseformer       Name       ALD       2         Stidac       Stidac       SHIBATA       2         Stidac       Stidac       SHIBATA       2         Storage Case for Equipment       SHIBATA       2         Storage Case       SHIBATA       2         Protector Sets       SHIBATA       2         2030L case       SHIBATA       2         Protector Sets       SHIBATA       2         2035ket y Glasses(MH-SKJ)       SHIBATA       20         2040cw(MK-250)       SHIBATA       20         205afet y Glasses(MH-SKJ)       SHIBATA       20         205afet y Butta       20       <	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Gas Washing Bottle Set		1	- <u>.</u>		
Electronic Balance[FX-3000] Main Main Main Main Main Main Filter Main Main Main Main Main Main Main Main	3.3.24	Pressure Gas Hose(9 × 21mm, 1m)	SHIRATA				
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<pre>system reperturnm x 10mm /pre>		Blear Flug( No.10) Discont Tracka Jan 2022	SHIBATA	30			
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<ul> <li>4)Silicon Tube</li> <li>5)Paper Wiper(Kim Wipe, 72pcs.)</li> <li>5)Paper Wiper(Kim Towel, 24pcs.)</li> <li>5)Pastics Sheet(3 × 3m)</li> <li>6)Pastics Sheet(3 × 3m)</li> <li>7)Plastics Sheet(3 × 3m)</li> <li>8)Carrier(150kg Use)</li> <li>8)Carrier(150kg Use)</li> <li>9)Lope(20m)</li> <li>Ntgentina:</li> </ul>			SHIRATA				
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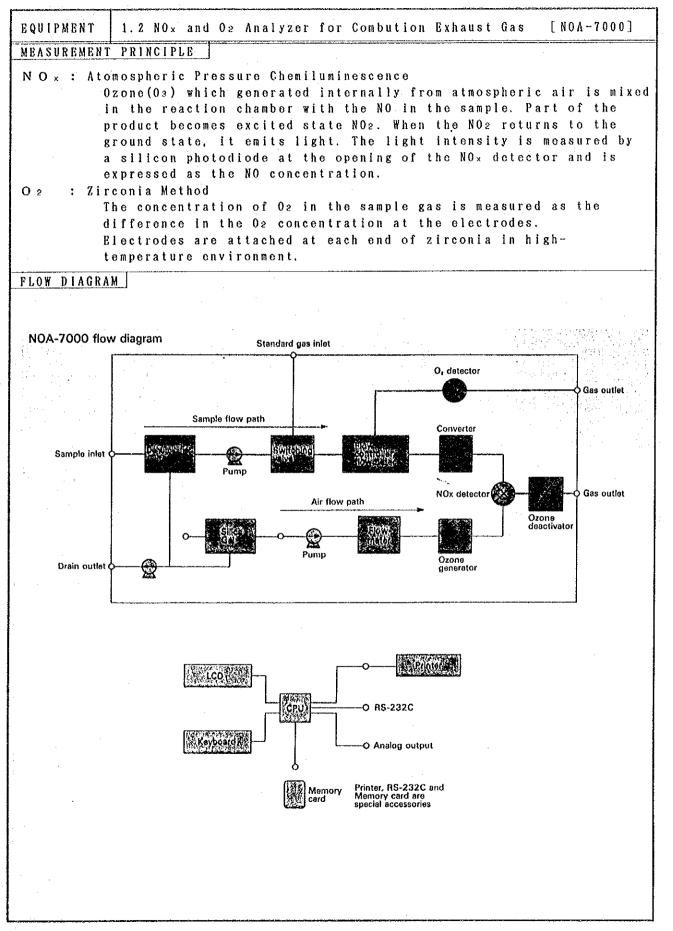
3.3.6       Unpermerc (anti ivery)       Argentia:       Argent	ITEN No.	No. EQUIPRENT [MODEL]	MANUFACTURE	QUANTITY (set)		SPECIFICATION	User
3.3.87       STIUDETRATC(deep type)       Argentina:       1         3.3.87       STIUDETRATC(deep type)       Argentina:       1         3.3.88       USYringe(10h lifer)       Argentina:       2         3.3.89       USYringe(10h lifer)       SIRMA       5         3.3.89       USYringe(10h lifer)       SIRMA       5         3.3.40       USYRING       SIRMA       5         3.3.40       USYRING       SIRMA       5         3.3.40       USYRING       SIRMA       5         3.3.40       USYRING       SIRMA       5         3.3.41       Vaume Grease(50k)       SIRMA       5         3.3.42       Product Photof       Japan:       Japan:       2         3.3.43       Product Photof       Japan:       Japan:       2         3.3.44       Vaume Grease(50k)       SIRMA       S00h liter × 14       0.6         3.4.1       Vaume Grease(50k)       SIRMA       S00h liter × 14       0.6         3.4.2       W10b Bariu Mostate       Japan: KMTO       S00h liter × 14       0.6         3.4.3       Product S01(Al 11/201)       Japan: KMTO       S00k       0.6         3.4.4       W10b Bariu Mostate       S	ຕ ຕ	<u>ب</u>	Argentina:		2		
<ul> <li>a. a. a</li></ul>	ç		Argentina:				
3.3.88       25%ringer(instruct)       Argentina:       2         3.3.89       Safety Fiberter       SHEATA       5         3.3.81       Safety Fiberter       SHEATA       5         3.3.82       Safety Fiberter       SHEATA       5         3.3.41       Regulator for Oxgen Gylinder       SHEATA       5         3.3.42       Filter Faper(56: # 110mm)       Japan:       Japan:       2         3.3.43       Powder Faper(50; # 110mm)       Japan:       Japan:       2         3.3.44       Vaume ferace(50bcs.)       Japan:       Japan:       50g x       3         3.3.44       Vaume ferace(50bcs.)       Japan:       Jada       Jaban:       Japan:	ŝ	n 		•			
3.3.38     Safety Fipetter     SilBATA     5       3.3.39     Glass Function     Magentina:     1       3.3.41     Filter Paper     Convertina:     1       3.3.42     Filter Paper     Convertina:     1       3.3.43     Filter Paper     SilBATA     5       3.3.43     Filter Paper     SilBATA     5       3.3.43     Fourder faper     SilBATA     50       3.3.45     Filter Paper     SilBATA     50       3.3.45     Convect Faper     SilBATA     50       3.3.45     Cass Offinder Holder     Japan:     Japan:       3.3.45     Cass Offinder Holder     Japan:     1       3.4     Jispan:     SHIMAZ     500     1       3.4.1     Precipitation Titration Apparatus     SHIMAZ     3     3       3.4.1     Precipitation Titration Apparatus     SHIMAZ     3       3.4.1     Precipitation Titration Apparatus     SHIMAZ     3       3.4.2     Barium Acetate     Japan: KANO     500     1       3.4.3     Protoconal liter, Triangular)     Japan: KANO     500     0       3.4.2     Barium Acetate     Japan: KANO     500     0     0       3.4.2     Protoconal     Japan: KANO <t< td=""><td></td><td>2)Syringe(50m liter)</td><td>Argentina: Argentina:</td><td></td><td>2 6</td><td></td><td></td></t<>		2)Syringe(50m liter)	Argentina: Argentina:		2 6		
<ul> <li>3.3.38 Glass Funel</li> <li>3.3.40 Govgen Cylinder(02:100%)</li> <li>3.3.41 Filter Paper Covgen Cylinder</li> <li>3.3.42 Filter Paper Covgen Cylinder</li> <li>3.3.42 Filter Paper Covgen Cylinder</li> <li>3.3.43 Protection Threader Sc: \$\$110mm\$)</li> <li>3.3.44 Filter Paper Govgen Cylinder</li> <li>3.3.45 Gas Cylinder Filter Paper Govgen</li> <li>3.3.45 Gas Cylinder Filter Paper Govgen</li> <li>3.4 JIS Precipitation Titration Apparatus</li> <li>3.4.1 Filter Paper Govgen</li> <li>3.4.5 Gas Cylinder Holder Cynes. Use)</li> <li>3.4.6 Argentina Actata</li> <li>3.4.6 Argentina Actata</li> <li>3.4.6 Argentina Actata</li> <li>3.4.7 Filter Paper GB: \$\$4 90mm\$)</li> <li>3.4.7 Filter Paper GB: \$\$4 90mm\$)</li> <li>3.4.8 Burtet (10m liter)</li> <li>3.4.1 Burtet (10m liter)</li> </ul>	ෆ්	<i></i>	SHIBATA				
3.3.40       Oxygen Cylinder (02:100%)       Mrgentina:       1         3.3.41       Filter Paper (02:100%)       Mrgentina:       1         3.3.42       Filter Paper (58: \$110mm)       Japan:       2         3.3.43       Filter Paper (50cs.)       Japan:       2         3.3.45       Servicional       Japan:       2         3.3.45       Servicional       Japan:       2         3.3.45       Servicional       Japan:       2         3.3.46       Jispan:       Japan:       2         3.3.47       Sultan'i       50gx 3       3         3.3.46       Jispan:KMTA       50gx 3       3         3.4       Jispan:KMTA       50gx 11       1         3.4.1       Flatenin Acctate       50lution       1         3.4.2       N/100 Barium Acctate       50lution       1       0.5         3.4.2       Marium Acctate       50lumister       1       0.5         3.4.3       N/100 Barium Acctate       50lumister       1       0.5         3.4.4       Historization Inter x       1       0.5       0.5       0.5         3.4.4       Martina Acctate       3.4.5       500mister       1       0.5 </td <td>3. 3. 3.</td> <td></td> <td>SHIBATA</td> <td></td> <td></td> <td></td> <td></td>	3. 3. 3.		SHIBATA				
<ul> <li>3.3.41 Regulator for Oxygen Cylinder</li> <li>3.3.42 Filter Paper(58: #110am)</li> <li>3.3.42 Filter Paper(58: #110am)</li> <li>3.3.43 Powder Paper(56: #110am)</li> <li>3.3.43 Powder Paper(56: #110am)</li> <li>3.3.44 Powder Paper(500pcs.)</li> <li>3.3.45 Cass(500pc)</li> <li>3.44 Vouue Grease(50g)</li> <li>3.44 Flatton Titration Apparatus</li> <li>3.41 Fracipitation Titration Apparatus</li> <li>3.41 Flatton Finiter Folder(2pcs. Use)</li> <li>3.42 Fracipitation Titration Apparatus</li> <li>3.44 Flatton Finiter Folder(2pcs. Use)</li> <li>3.45 Cass(300m liter. Triangular)</li> <li>3.48 Propandi</li> <li>3.48 Fraction Apparatus</li> <li>3.41 Flatton Finiter Folder(3pcs. Use)</li> <li>3.41 Fraction Finiter Folder(3pcs. Use)</li> <li>3.42 Fraction Titration Apparatus</li> <li>3.43 Fraction Titration Apparatus</li> <li>3.44 Finiter Folder(3pcs. Use)</li> <li>3.45 Arsenzo II</li> <li>3.45 Arsenzo II</li> <li>3.46 ArsenzioII</li> <li>3.41 Suffur Arsenzo II</li> <li>3.42 Suffur Arsenzo II</li> <li>3.43 Suffur Arsenzo II</li> <li>3.44 Suffur Arsenzo II</li> <li>3.45 Arsenzo II</li> <li>3.41 Suffur Arsen</li></ul>	 		Argentina:				
3.3.42       Filter Paper(58: #110mm)         1)Filter Paper(58: #110mm)       Japan:         2)Filter Paper(58: #110mm)       Japan:         3.3.43       Powder Paper(50: #110mm)         3.3.44       Vauume Grease(500pcs.)         3.3.45       Gas (Vinder Molder(20cs. Use)         3.3.45       Gas (Vinder Holder(20cs. Use)         3.46       JIS Frecipitation Titration Apparatus         3.41       Flask(300m liter. Triangular)         3.45       Gas (Vinder Holder(20cs. Use)         3.46       JIS Frecipitation Titration Apparatus         3.41       Flask(300m liter. Triangular)         3.42       N100 Barium Acetate Solution         3.43       Propans.KANTO         3.44       Vauume Strank         3.41       Flask(300m liter. Triangular)         3.42       N100 Barium Acetate Solution         3.43       Propanol         3.44       Vauume Strank         3.45       Mrematon         3.4       Propanol         3.4.1       Flask(300m liter. X         3.4.2       Mrematon         3.4.3       Propanol         3.4.4       Propanol         3.4.5       Mrematon         3.4.6       Mremat	9. 9. 1		Argentina:				
1)Filter Paper(56: \$110mm)Japan:Japan:3.3.432)Filter Paper(56: \$110mm)Japan:Japan:3.3.44Faper(56: \$110mm)Japan:Japan:3.3.45Gas Cylinder Holder(2pcs. Use)SHBMTA50gx33.3.45Gas Cylinder Holder(2pcs. Use)SHBMTA50gx33.4Jis Precipitation Titration AparatusSHIMAZU50gx33.4Jis Precipitation Titration AparatusSHIMAZU50gx33.4Jis Precipitation Titration AparatusSHIMAZU50gx33.4Jis Precipitation Titration AparatusSHIMAZU50gx33.4Jis Precipitation Titration AparatusSHIMAZU50gx13.4Jis Precipitation Titration AparatusSHIMAZU50gx13.4.1W100 Barium AcetateJapan: KMTO500g itter x13.4.2M100 Barium AcetateJapan: KMTO500g itter x13.4.3Acetic Acid4(3.1.3)Argentina: HERK1,000m liter x13.4.4PropenciArgentina: KERK1,000m liter x13.4.5Mrsenazo mArgentina: KERK1,000m liter x10.53.4.6Arsenazo mArgentina: KERK1,000m liter x10.53.4.7Filter Paper(58: \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$	ຕ. ຕໍ	<u>دي</u>					
2)Filter Paper(5C: φ 110mm)       Japan:       1         3.3.44       Ponder Paper(5C: φ 110mm)       Japan:       1         3.3.45       Fonder Paper(50cs.)       SHIBATA       50g x       1         3.3.45       Gas Cylinder Holder(2pcs. Use)       SHIBATA       50g x       1         3.45       Gas Cylinder Holder(2pcs. Use)       SHIBATA       50g x       1         3.45       Gas Cylinder Holder(2pcs. Use)       SHIBATA       300m liter x       2         3.4       JIS Frecipitation Titration Apparatus       SHIBATA       300m liter x       2         3.4       Flask(30m liter, Triangular)       Japan:KANTO       300m liter x       1         3.4.1       Flask(30m liter, Triangular)       Japan:KANTO       500g x       1         3.4.2       W100 Barium Acetate       Japan:KANTO       500g x       1       0.5         3.4.3       Zertic Acid#(3.1.3)       Accetic Acid#(3.1.3)       Accetic Acid#(3.1.3)       Accetic Acid#(3.1.3)       0.5         3.4.4       Zerndan       Zerndan       Margentina: MERK       1.000m liter x       1       0.5         3.4.5       Metric Acid#(3.1.3)       Accentina: MERK       SHIBATA       5       0.5       5         3.4.6			Japan :	-	2		
<pre>3.3.43 Powder Faper(500pcs.) 3.3.43 Powder Faper(500pcs.) 3.3.44 Youwe Grease(50g) 3.3.44 Youwe Grease(50g) 3.3.45 Gas Cylinder Holder(2pcs. Use) 3.4 I Plask(300m liter. Triangular) 3.4.1 Flask(300m liter. Triangular) 3.4.2 NN100 Barium Acetate Solution 3.4.2 NN100 Barium Acetate Solution 3.4.3 NN100 Barium Acetate Solution 3.4.1 Flask(300m liter. Triangular) 3.4.5 NN100 Barium Acetate 3.4.3 NN100 Barium Acetate 3.4.3 NN100 Barium Acetate 3.4.3 NN100 Barium Acetate 3.4.3 NN100 Barium Acetate 3.4.4 NN100 Barium Acetate 3.4.5 NN100 Barium Acetate 3.4.5 NN1000 Barium Acetate 3.4.5 Nu100 Barium Acetate 3.4.5 Scand for Buret 3.4.1 Buref(10m liter X 1 0.5 3.4.7 Filter Paper(58: &amp; 90mm) 3.4.9 Sulfuric Acid*(3.2.1) 3.4.1 Scatian Carbonate Browophenol Blue </pre>			Japan:				
<ul> <li>3.3.4.4 Youwe Grease(50g)</li> <li>3.3.4.5 Cas Cylinder Holder (2pcs. Use)</li> <li>3.3.4.5 Cas Cylinder Holder (2pcs. Use)</li> <li>3.4.1 Flask(300m litter, Triangular)</li> <li>3.4.1 Flask(300m litter, Triangular)</li> <li>3.4.2 M/100 Barium Acetate Solution</li> <li>3.4.3 M/100 Barium Acetate Solution</li> <li>3.4.5 M/100 Barium Acetate Solution</li> <li>3.4.6 M/100 Barium Acetate Solution</li> <li>3.4.5 M/100 Barium Acetate Solution</li> <li>3.4.6 M/100 Barium Acetate Solution</li> <li>3.4.7 M/1000 Barium Acetate Solution</li> <li>3.4.8 Buret(10m liter)</li> <li>3.4.9 Stand for Buret</li> <li>3.4.10 Solution Carbonate</li> <li>4.10 Solution Carbonate</li> <li>4.10 Solution Carbonate</li> </ul>		2	Japan :				
<ul> <li>3.3.45 Gas Cylinder Holder(2pcs. Use)</li> <li>3.4.1 Flast(300m liter. Triangular)</li> <li>3.4.2 N/100 Barium Acctate Solution</li> <li>3.4.2 N/100 Barium Acctate Solution</li> <li>3.4.3 N/100 Barium Acctate Solution</li> <li>3.4.4 Papan:KANTO 500m liter × 1</li> <li>3.4.5 Hydrogen Peroxide</li> <li>3.4.5 Hydrogen Peroxide</li> <li>3.4.7 Nrgentina: WRX 1.000m liter × 1</li> <li>3.4.6 Arsenazo m</li> <li>3.4.7 Filter Paper(5B: \$\$ 90mm)</li> <li>3.4.8 Burret(10m liter)</li> <li>3.4.9 Stand for Buret</li> </ul>	3.3.		SHIRATA	50e X			
<ul> <li>3.4 JIS Precipitation Titration Aparatus</li> <li>3.4.1 Flask(300m liter. Triangular)</li> <li>3.4.2 W/100 Barium Acetate Solution</li> <li>3.4.2 W/100 Barium Acetate Solution</li> <li>3.4.3 W/100 Barium Acetate Solution</li> <li>3.4.4 M/100 Barium Acetate Solution</li> <li>3.4.5 M/100 Barium Acetate Solution</li> <li>3.4.6 Mrgentina: MERK</li> <li>3.4.6 Mrgentina: MERK</li> <li>3.4.7 Filter Paper(5B: \$\$ 90mm)</li> <li>3.4.7 Filter Paper(5B: \$\$ 90mm)</li> <li>3.4.7 Filter Paper(5B: \$\$ 90mm)</li> <li>3.4.9 Stand for Buret</li> <li>3.4.10 Sulfuric Acid(3.2'.1)</li> <li>3.4.10 Sulfure Acid(10m liter)</li> <li>3.4.10 Sulfure Acid Acid Acid</li> <li>3.4.10 Sulfure Acid Acid</li> <li>3.4.10 Sulfure Acid</li> <li>4.4.10 Sulfure Acid</li> <li>4.5 Sulfure Acid</li> <li>4.6 Acomphenol Blue</li> <li>4.7 Sulfure Acid</li> <li>4.8 Sulfure Acid</li> <li>4.9 Sulfure Acid</li> <li>4.10 Sulfure Acid</li> <li>4.</li></ul>			SHIMADZU				
$3.4$ JIS Precipitation Titration Apparatus $3.4.1$ Risk(30m liter. Triangular) $3.4.2$ N/100 Barium Acetate $3.4.3$ Acetate $3.4.4$ Acetate $3.4.5$ Metric Acid#(3.1.3) $3.4.5$ Hydrogen Peroxide $3.4.5$ SHIBATA $5.4.4$ Siller Paper(5B: $\phi$ 90mm) $3.4.5$ SHIBATA $5.4.7$ SHIBATA $5.4.8$ Stand for Buret $5.4.8$ Submitter $5.4.8$ Solut Carbonate $5.4.8$ Solut Carbonate $5.4.8$ Solut Carbonate $5.4.10$ Solut Carbonate $5.4.8$ Solut Carbonate $5.4.8$ Solut Carbonate $5.4.10$ Solut Carbonate $5.4.8$ <t< td=""><td></td><td></td><td>· ·</td><td></td><td></td><td></td><td></td></t<>			· ·				
1       Flask(300m liter, Triangular)       SHIBATA       300m liter × 24         2       N/100 Barium Acetate Solution       Japan:KANTO       500m liter × 1         2       Barium Acetate       Japan:KANTO       500m liter × 1         3       Acetic Acid#(3.1.3)       Japan:KANTO       500m liter × 1         4       2-Propanol       Japan:KANTO       500m liter × 1         5       Moetic Acid#(3.1.3)       Argentina:MERK       1,000m liter × 1         6       Argentina:MERK       1,000m liter × 1       0.5         7       Filter Paper(5B: ¢ 90mm)       502×       1       0.5         7       Filter Paper(5B: ¢ 90mm)       SamiBATA       3       3         8       Buret(10m liter)       5       5       5         9       Stand for Buret       Sulfuric Acid#(3.2'.1)       5       -         10       Sulfuric Acid#(3.2'.1)       Sulfuric Acid#(3.2'.1)       3       3         9       Sulfuric Acid#(3.2'.1)       Sulfuric Acid#(3.2'.1)       3       3         9       Sulfuric Acid#(3.2'.1)       Sulfuric Acid#(3.2'.1)       -       -         9       Sulfuric Acid#(3.2'.1)       Sulfuric Acid#(3.2'.1)       3       -         10	eni.	JIS Precipitation Titration Apparatus				Sox:Flue Gas	
<pre>2 N/100 Barium Acetate Solution 2 Barium Acetate Solution 3 Acetic Acid#(3.1.3) 4 2-Propanol 5 Mrgentina: MERK 1.000m liter × 1 0. 4 2-Propanol 5 Mrgentina: MERK 500m liter × 1 0. 7 Filter Paper(5B: \$\$ 90mm) 7 Filter Paper(5B: \$\$ 90mm) 8 Buret(10m liter) 8 Buret(10m liter) 9 Stand for Buret 8 Stand for Buret 9 Stand for Buret 8 Stand for Buret 9 Stand for Buret 8 Stand for Buret 9 Stand f</pre>	÷		SHIBATA	×	4		
2       Barium Acctate       Japan:KANTO       500g ×       1         3       Acctic Acid#(3.1.3)       Acctic Acid#(3.1.3)       0.         4       2-Propanol       Argentina:       7,000m liter × 1       0.         5       Hydrogen Peroxide       Argentina: WERK       1,000m liter × 1       0.         6       Arsenazo m       Argentina: WERK       1,000m liter × 1       0.         7       Filter Paper(5B: & 90mm)       SHIBATA       5g ×       5         8       Buret(10m liter)       5g ×       5       3         9       Stand for Buret       SHIBATA       3       3         10       Sulfuric Acid#(3.2'.1)       5g ×       5       -         9       Stand for Buret       Sulfuric Acid#(3.2'.1)       3       3         10       Sodium Carbonate       Sulfuric Acid#(3.2'.1)       -       -       -	4		Japan: KANTO				
3       Acetic Acid*(3.1.3)       Argentina:       7.000m liter × 1       0.         5       Hydrogen Peroxide       Argentina: WERK       1.000m liter × 1       0.         5       Hydrogen Peroxide       Argentina: WERK       1.000m liter × 1       0.         6       Arsenazo m       Argentina: WERK       55×       1       0.         7       Filter Paper(3B: \$\phi\$ 90mm)       SHIBATA       3       3         9       Stand for Buret       SHIBATA       3       3         9       Stand for Buret       5       7       5         9       Sulfuric Acid*(3.2'.1)       5       7       7         9       Sulfuric Acid*(3.2'.1)       5       7       7         10       Sodium Carbonate       5       7       7	4		Japan:KANTO	:			
4       2-Propanol       7,000m liter × 1       0.         5       Hydrogen Peroxide       Argentina:WERK       1,000m liter × 1       0.         6       Arsenazo m       Argentina:WERK       55×       1       0.         7       Filter Paper(3B: ¢ 90mm)       51×       1       0.         7       Filter Paper(3B: ¢ 90mm)       55×       5       1       0.         8       Buret(10m liter)       55×       5 <td>4</td> <td></td> <td></td> <td>•</td> <td></td> <td>· · · ·</td> <td></td>	4			•		· · · ·	
5       Hydrogen Peroxide       Argentina:WERK       1,000m liter × 1       0.         6       Arsenazo m       Argentina:WERK       5g×       1       0.         7       Filter Paper(58: \$\$ 90mm)       5g×       1       0.         7       Filter Paper(58: \$\$ 90mm)       5g×       1       0.         8       Buret(10m liter)       5g×       5       5         9       Stand for Buret       5       5       5         10       Sulfuric Acid*(3.2'.1)       5       5       5         10       Sodium Carbonate       5       5       5         10       Sodium Carbonate       5       5       5         9       Stand for Blue       5       5       5         10       Sodium Carbonate       5       5       5         11       Sodium Carbonate       5       5       5         11       Sodium Carbonate       5       5       5         10       Sodium Carbonate       5       5       5         10       Sodium Carbonate       5       5       5         11       Subterol Blue       5       5       5       5	7		Argentina:	7.000m liter ×	1 0.6		
<pre>6 Arsemazo II</pre>	Y.		Argentina:MERK	1.000m liter X	0.5		
<pre>7 Filter Paper(5B: \$ 90mm) 5g× 8 Buret(10m liter) 5g× 9 Stand for Buret 9 Stand for Buret 9 Sulfuric Acid*(3.2'.1) Sodium Carbonate 8 romophenol Blue</pre>	4		Argentîna: WERK				
<ul> <li>7 Filter Paper(58: Ø 90mm)</li> <li>8 Buret(10m liter)</li> <li>9 Stand for Buret</li> <li>10 Sulfuric Acid*(3.2'.1)</li> <li>8 Sodium Carbonate</li> <li>8 Bromophenol Blue</li> </ul>			Japan: DOTAITO	5g×			
8       Buret(10m liter)       SHIBATA         9       Stand for Buret       SHIBATA         10       Sulfuric Acid*(3.2'.1)       Sodium Carbonate         9       Sodium Carbonate       Bromophenol Blue			SHIBATA	•			
<ul> <li>Stand for Buret</li> <li>Sulfuric Acid*(3.2'.1)</li> <li>Sodium Carbonate</li> <li>Bromophenol Blue</li> </ul>	3.4.8		SHIBATA				
10 Sulfuric Acid*(3.2'.1) Sodium Carbonate Bromophenol Blue	3.4.0		SHIBATA			-	
	4 7						
		Sodium Carbonate			1		
		Bromophenol Blue					
			-				

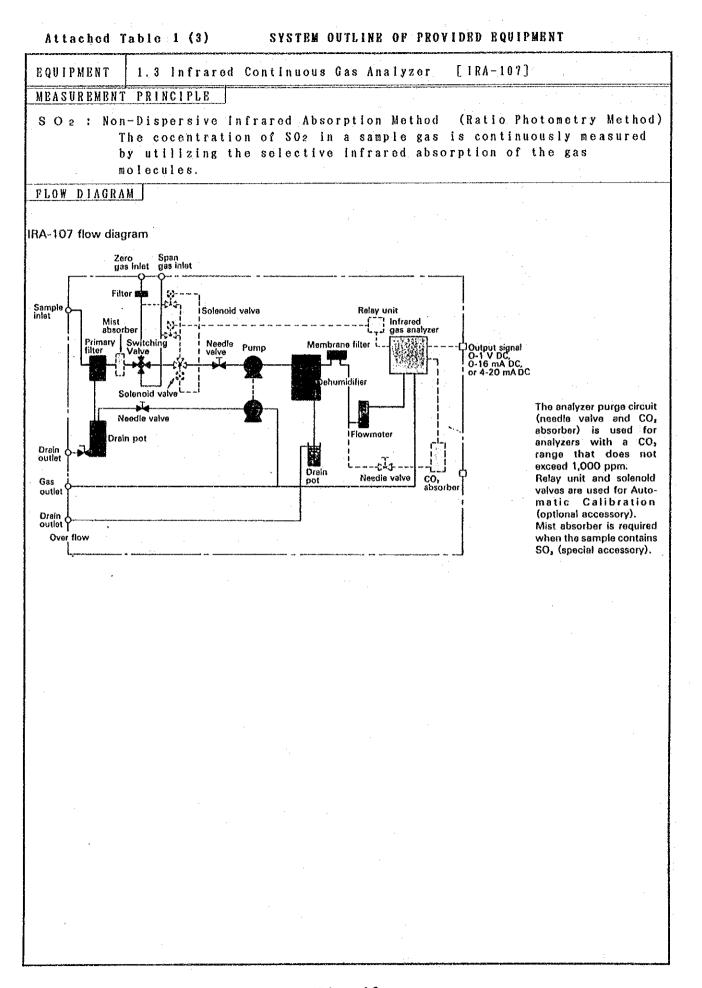
LIST OF EQUPMENT SUPPLIED TO ARGENTINA

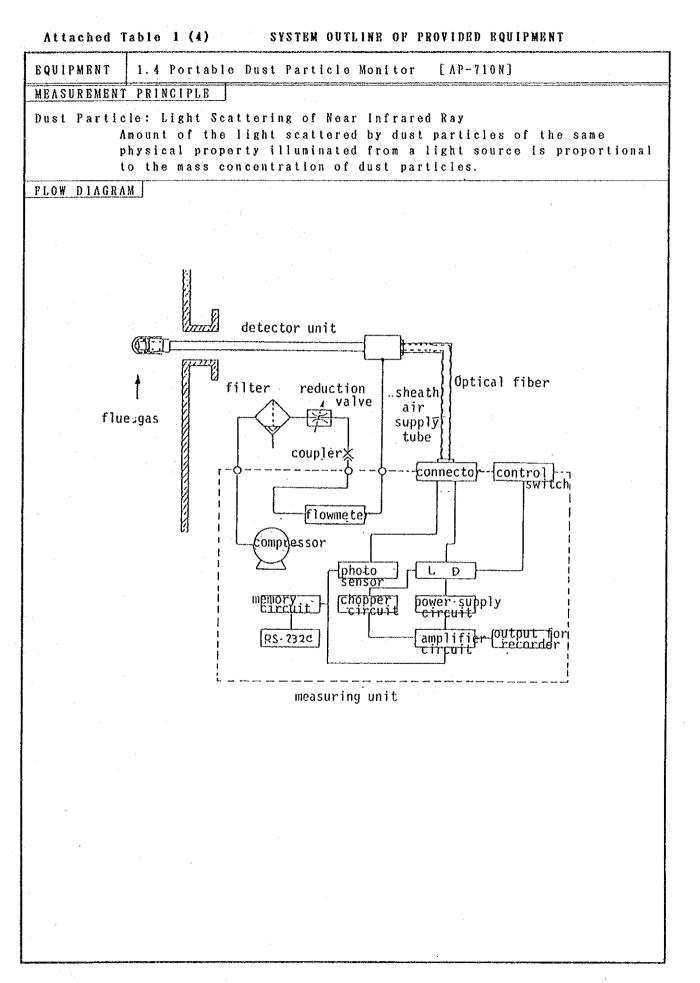


Attached Table 1 (2)

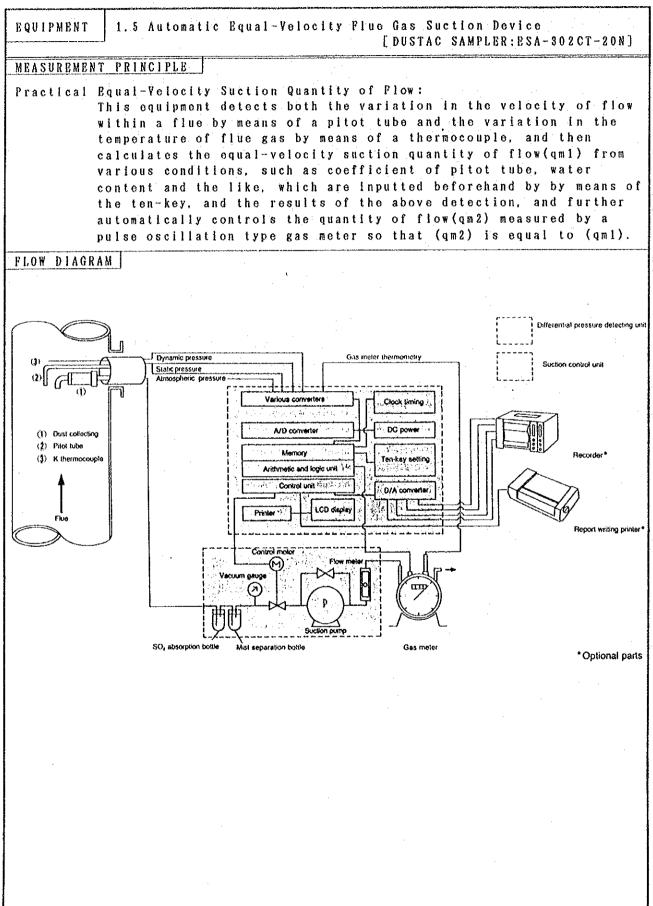
SYSTEM OUTLINE OF PROVIDED EQUIPMENT



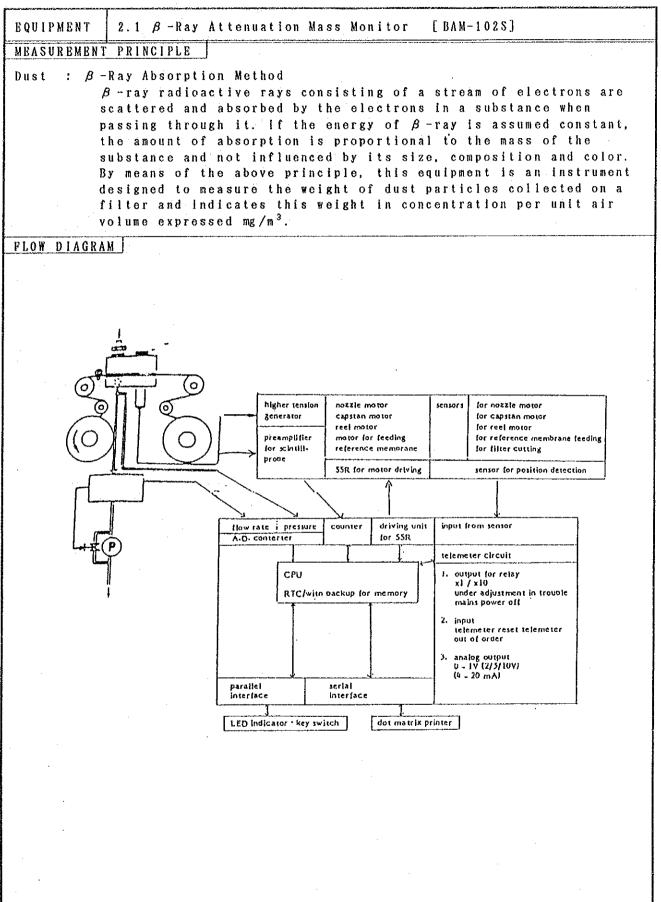






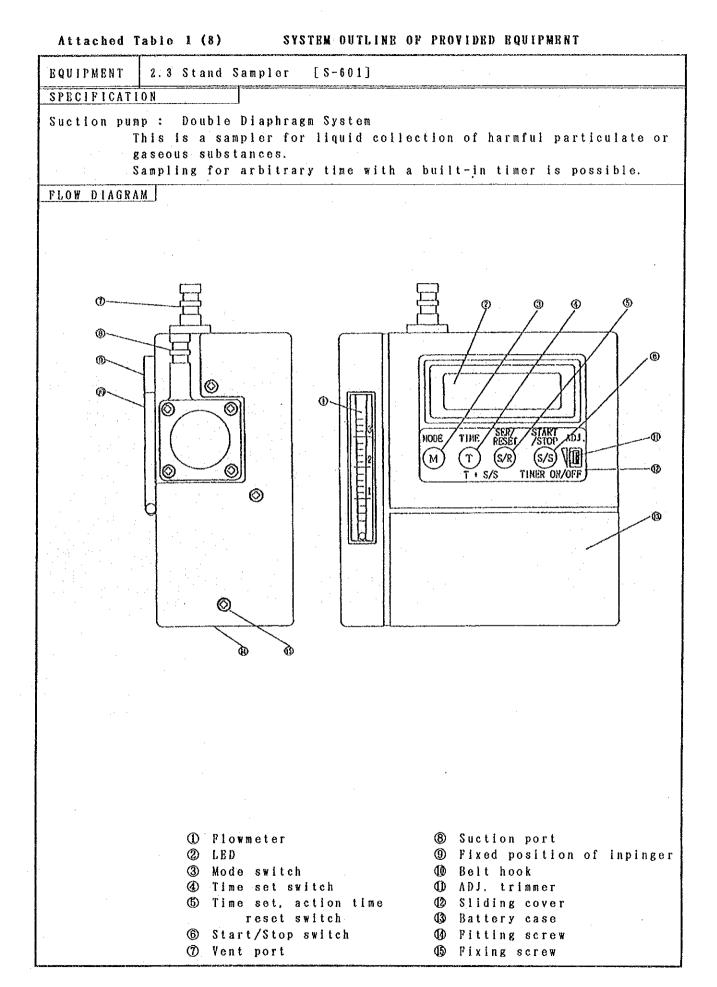


Attached Table 1 (6) SYSTEM OUTLINE OF PROVIDED RQUIPMENT



Attached Table 1 (7) SYSTEM OUTLINE OF PROVIDED EQUIPMENT

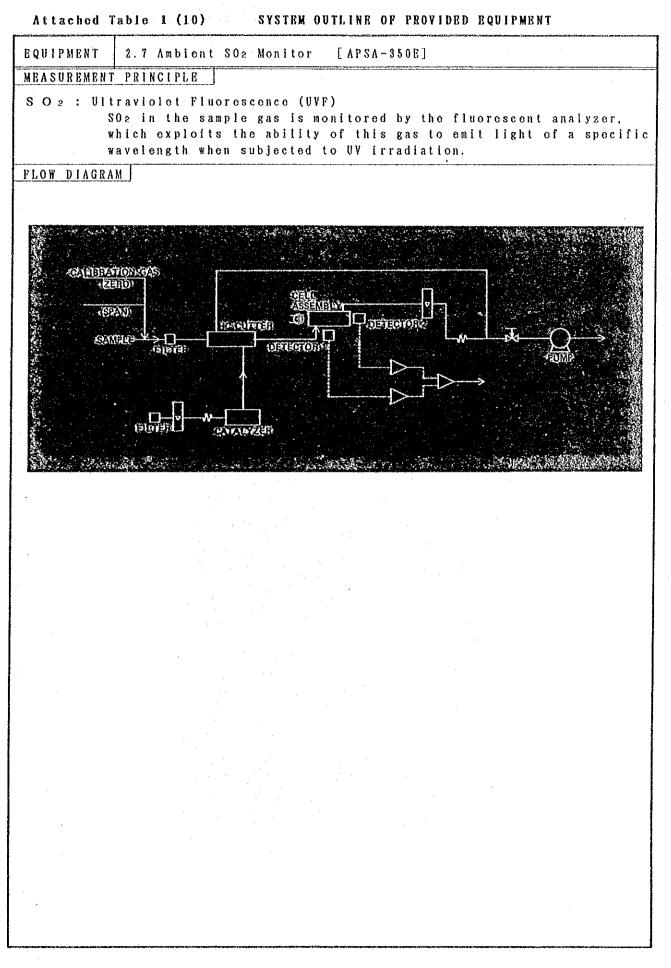
	ZAZIRW ONITINK OL DROAIDRD RÖNILWRWL
EQUIPMENT 2.2 High Volu	ime Air Sampler [NVC-1000N]
SPECIFICATION	
This instrument Particulate Mat The concentrati weigt of filter This instrument automatic const by increase in This instrument , "integrated f failure measure	ensures stable amount of sucked air due to adopted ant flow system minimizing loss in sucked air flow pressure drop caused by SPM settled on filter. has functions "instantaneous flow rate indication" low rate indication", "automatic sampling", "power
FLOW DIAGRAM	
	Image: Constant flow device   Image: Constant flo
Name of components	
<ul> <li>adapter for assembly</li> <li>potentiometer</li> <li>display</li> </ul>	D potentiometer D fuse holder D main switch D plug for power supply D pump unit



Attached Table 1 (9)

SYSTEM OUTLINE OF PROVIDED BQUIPMENT

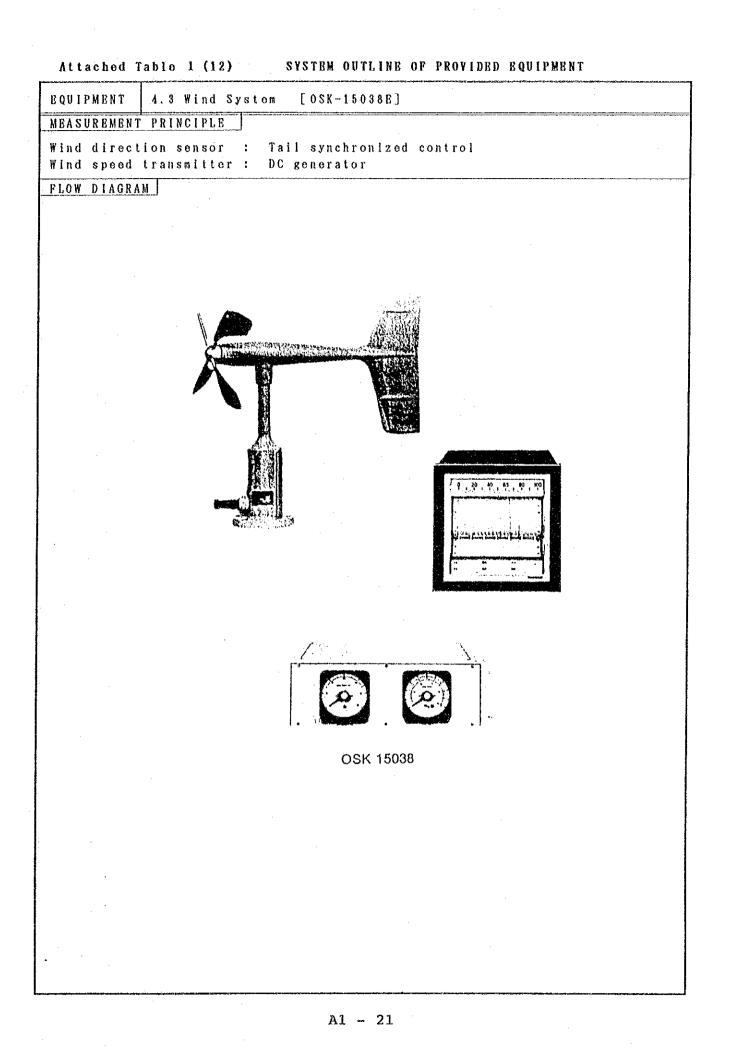
BQUIPMENT 2.6 Ambient NOx Monitor [APNA-350E] MEASUREMENT PRINCIPLE N O x : Chemiluminescence (CLD) Inside the reaction chamber, NO reacts with ozone(03) to from NO2. A portion of the NO2 is excited to a higher electron state, and detectable chemiluminescence is emitted as these molecules return to the ground state. This chemiluminescence is measured through an optical filter by a sensitive solid detector. The output of the solid detector is linearly proportional to the NOx concentration when line-1 flow is measured, and the NO concentration when line-2 flow is measuerd. The NO2 concentration is determined by an electronic subtraction circuit which subtracts the NO signal from the NO<sub>×</sub> signal. FLOW DIAGRAM e an hand too and the fatter of 15. 26. 1 14072.34 ÷.

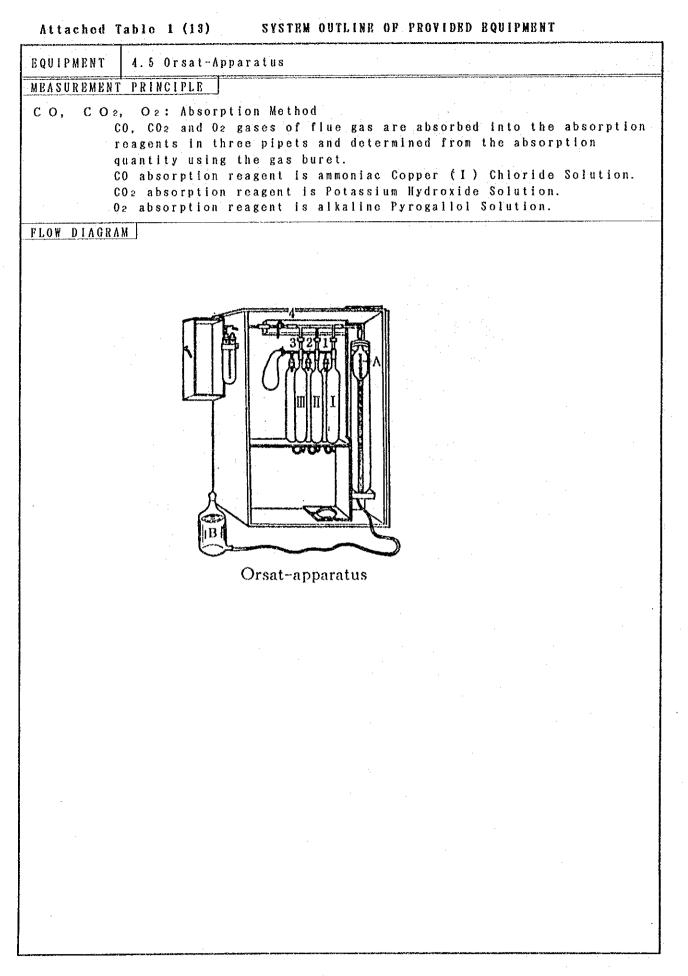


Attached Table 1 (11) SYSTEM OUTLINE OF PROVIDED EQUIPMENT

	ent SPM Monitor [/	······································		
MEASUREMENT PRINCIPL				
Dust : β-Ray Absor Absorption	ption of $\beta$ -Ray passing t	through matter de	pends on upon th	10
mass of th	ie matter.			-
	e tape background is volume of ambient a			cle.
	it cycle and the part			ted
	a spot on the samplicity of $\beta$ -ray after		through the	•.
	es on the sample tag			
scintillat				
	are processed by an ion of particulates			; tne
FLOW DIAGRAM				
boa z manne j				
	CYCLON			
	SAMPLE			•
		BIRANY SIQUERES		
		DIVANA STOLOTATOF		
		<b>F</b>		
			·	
	7	DEIRECTION		
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# **APPENDIX 2**

# Standard Analysis Procedure for the Related Pollutants

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## Appendix 2 Standard Analysis Procedure for the Related Pollutants

Following documents were handed over to SE.

(1)	Standar	d Analysis Procedure for the Related Pollutants
	JIS	
	1) JIS	5 K0103 : Methods for Determination of Sulfur Oxides in Flue Gas
·	2) JIS	5 K0104 : Methods for Determination of Oxides of Nitrogen in Flue Gases
	3) JIS	5 Z8802 : Methods of Measuring Dust Concentration in Flue Gas
	<u>EPA</u> 4) EPA	Subchapter C Part 50 Appendix A

: Reference Method for the Determination of

- Sulfer Dioxide in the Atmosphere
  - (Pararosaniline Method)

5) EPA Subchapter C Part 50 Appendix B

: Reference Method for the Determination of Suspended Particulate Matter in The Atmosphere (High-Volume Method)

(2)

) Related Analytical Procedure of JIS, EPA and WHO

J	I	S

010			
1)	JIS	к0050	: General Rules for Chemical Analysis
2)	JIS	K0095	: Methods for Sampling of Flue Gas
3)	JIS	K0115	: General Rules for Molecular Absorptiometric
			Analysis
4)	JIS	K0301	: Methods for Determination of Oxygen in Flue
			Gas
5)	JIS	K0004	: Sulfur Dioxide (Standard Reference Gas)
6)	JIS	B7952	: Continuous Analyzers for Sulfur Dioxide in
•	. *		Ambient Air
7)	JIS	B7981	: Continuous Analyzers for Sulfur Dioxide in
			Flue Gas

8)	JIS K0001 : Nitrogen Monoxide (Standard Reference Gas)
9)	JIS B7953 : Continuous Analyzers for Oxides of Nitrogen
	in Ambient Air
10)	JIS B7982 : Continuous Analyzers for Oxides of Nitrogen
	in Flue Gas
11)	JIS K0901 : Form, size and performance testing methods
	of Filtration Media for Collecting Airborne
· .	Particulate Matters
12)	JIS 28814 : Low Volume Air Samplers and Methods for
	Measuring Mass Concentration of Airborne
1 0 1	Dust by the Low Volume Air Samplers
13)	JIS B7954 : Automatic Monitors for Suspended Particulate
	Matter in Ambient Air
EPA	
	EPA Subchapter C Part 53 Subpart B
10)	: Procedures for Testing Performance
	Characteristics of Automated Methods SO <sub>2</sub> ,
	$CO_{3}$ and $NO_{2}$
16)	EPA Subchapter C Part 50 Appendix F
,	: Measurement Principle and Calibration
	Procedure for the Measurement of Nitrogen
	Dioxide in the Atmosphere
	(Gas Phase Chemilumineseence)
<u>WHO</u>	
	WHO Chapter 2 : Sulfure Dioxide
•	WHO Chapter 4 : Nitric Oxide and Nitrogen Dioxide
19)	WHO Chapter 1 : Suspended Particulate Matter
<b>T</b>	
	truction Manual of the Analytical Instruments Provided to
cne	Government of Argentina
1)	NOx-O <sub>2</sub> Gas Analyzer : NOA-7000
2)	Infrared Continuous Gas Analyzer : MODEL IRA-107
3)	Infrared Gas Analyzer : MODEL URA-107
4)	Portable Dust Particle Monitor : MODEL AP-710N
5)	Dust Sampler : MODEL ESA-302CT-20N
6)	β-Ray Attenuation Mass Monitor : MODEL BAM-102S
, 7)	High Volume Dust Sampler : MODEL HVC-1000N

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(3)

- 8) Stand Sampler
- 9) Ambient NOx Monitor
- 10) Ambient SO<sub>2</sub> Monitor
- 11) Ambient Particulate Monitor
- 12) Wind System

- : MODEL S-601
- : MODEL APNA-350E
- : MODEL APSA-350E
  - : MODEL APDA-350E
    - : MODEL OSK-15038

# APPENDIX 3

Supplementary Instruction Manual for Analysis and Measurement of Pollutants from Flue Gas and in the Ambient Air

Appendix	3 Supplementary Instruction Manual for Analysi and Measurement of Pollutants from Flue Gas and in the Ambient Air	.\$
		Page
I	Sulfur Dioxide	A3-I-1
II	Method of Measuring Dust Concentration in Flue Gas	A3-II-1

- III Automatic Monitors for Suspended Particulate Matter in Ambient Air..... A3-III-1
- IV Measuring Method for Particle-size Distribution of Dusts in Flue Gas..... A3-IV-1

#### I. SULFUR DIOXIDE

1. Coverage: A standard material should not be limited in application to particular measuring instruments, but should be considered for a wide range of applications. This standard gas, therefore, is one that can be used as a standard for the graduation and calibration of measuring equipment, a starting material for the preparation of gas for calibration, and a standard for general chemical analyses.

2. Definition of Term: Each is clearly defined in accordance with the concept that a standard material conforms to national standards.

- (1) Sulfur Dioxide Standard Gas: It is made clear that the sulfur dioxide standard gas prescribed in this specification conforms to national standards based on Certified Reference Material defined in ISO or OIML and is confirmed about its quality by a public organization for examination.
- (6) Sulfur Dioxide Reference Standard Gas of Primary Standards: The sulfur dioxide reference standard gas of primary standards is prepared by mixing high purity gases of secondary standards by a public organization for examination. It is named the reference standard gas of the primary standards, because its function for mixed gas is similar to that of The Primary Standard for Weights.

3. Concentration (Code) and Grade: Twenty different concentrations are selected by taking into account the calibrations specified in JIS K 0055 (Common Rules for Calibration Method of Gas Analyzers), the range of measurement of currently available measuring instruments, and the concentration zone deemed necessary for measurements unrelated to environmental pollution.

Codes numbered greater than SD-P60 have the permissible concentration range of 90-100% of the upper limit, and those smaller than SD-P60 have the range of 80-100% of the limit. SD-P2000, for example, may take values between 1,800 ppm and 2,000 ppm. The three grades, high purity grade, general first grade, and general second grade, are selected, following the concept of grade in the class of the mass standards. It was duly considered that the gas would be used in a large amount for daily analytical work and the grades would not need to be defined very strictly.

The major applications of each of the grades are shown in the following Explanatory Table:

Grade	Application			
High Purity Standard Gas	Measurements for regulations by local governments Measurements by firms issuing environmental certificates Calibration of densitometers by firms of public nature for clearance with authorities Graduation and calibration of densitometers by manufacturers of instruments Measurements requiring high levels of confidence			
General Standard Gas, First Grade	Starting material for preparation of gas for calibration Measuring concentration of gas formed by generators of gas for calibration			
General Standard Gas, Second Grade	General applications other than the above			

Explanatory Table Major Applications of Each Grade

Container for High Pressure Gas and Valve: The Regulation of 5. High Pressure Gas applies to the standard gas. Containers and valves used must meet the regulation. The containers are usually not made specifically for the standard gas. Treatments of the containers such as grinding the inner surface are necessary for maintaining the gas concentration stably for a long period of time. The regulation does not prescribe the treatments. The aforementioned studies commissioned by Standards Department of Agency of Industrial Sciences and Technology and those (1978-1980) commissioned by Weights and Measurements Division of Ministry of International Trade and Industry have shown that the standard gas of low concentration can be kept relatively stable in the containers that are super-ground, gold-plated, and gastreated on the inner surface.

The regulation of high pressure gas was partly revised in 1980 to permit aluminum alloy containers for high pressure gases as manganese steel containers had been. Stainless steel valves of containers for high pressure gases have little effects on the concentration of the standard gas, but they are legally required to be certified prior to use.

6. Preparation and Filling: The preparation procedure of the standard gas is not specified in the standards. They may be prepared the methods of pressure ratio or flow rate ratio. The most important properties of the standard gas are strictly maintained concentration and stability. As prescribed in 8.1(2) Expressed Values of Concentration, concentrations are determined against the reference standard gas. Therefore, its homogeneity in a container is more important than the preparation method. A homogeneous mixture is obtained by:

- 1. leaving a filled container laid at room temperature for 24-48 hours.
- keeping a filled container slanted and warming the bottom to about 40°C.
- 3. laying and rotating a filled container.

#### 7. Quality

7.3 Filled Pressure: It should be within ±10% of a specified pressure. The allowance takes into consideration gas quantity used for tests.

7.5 Effective Period: There are problems in maintaining the standard gas at a constant concentration for long, although it would be ideal to do so. The standard adopts an effective period based on the result of the studies commissioned by Standards Department of Agency of Industrial Sciences and Technology.

Note : The standard instructs against using the standard gas when residual pressure decreases below 15 kgf/cm<sup>2</sup>, because the effects of the gas used for the container

#### treatment may manifest when residual pressure is low.

There are opinions favoring a lower pressure as the cutoff point, but no data is available for judgment. 15kgf/cm2 is adopted from past experience.

8. Test Method

8.1(1) Analyzer: Four kinds of analyzers are chosen, which are widely used, quick in response, and good in reproducibility.

8.1(2) Expressed Value of Concentration: The expressed values of concentration are based on the reference standard gas of secondary standards, which is maintained in accordance with JIS K 0055 (Common Rule for Calibration Method of Gas Analyzer) by public organizations for examination, who adopt an analyzer chosen in 8.1 to conform to national standards.

The significant number of the values is three. That for values not greater than 1 ppm is two, considering the accuracy of analyzers and the change of gas over time.

8.2 Note on Test Method of Gas Leakage (3): Foaming solution should be wiped off well, because, if it is left, it might alter the concentration of sample gas.

8.3 Test Method for Filled Pressure: The regulation of high pressure gas adopts the following definition: a gas with pressure not lower than 10 kgf/cm<sup>2</sup> under ordinary temperature is a compressed gas; a compressed gas with pressure not lower than 10 kgf/cm<sup>2</sup> regardless of temperature or a compressed gas with pressure not less than 10 kgf/cm<sup>2</sup> at 35°C is a high pressure gas. Accordingly, values of filled pressure at 35°C should be shown.

9. Test: For the purpose of improving confidence level in the users of chemical standard materials, JIS K 0501 (Common Rule of Chemical Standard Material) requires the name of a third party, operating under the administrative guidance of the national government, who issues certificates for the determined values of concentration.

As mentioned previously, the definition of Certified Reference Material by ISO also states that certificates or other documents issued by a certifying organization should be attached. This standard adopts a provision for test as part of certification. The standard gas is one that passes the test.

9.(1) Deviation of Concentration: A high purity gas should be measured by two analyzers of different principles. Resulting two values must be within  $\pm 1.0$ % of each other.

10. Handling Care: The regulation of high pressure gas applies to the standard gas. On the other hand, it needs to be handled carefully as a standard material.

(1) Storage Method: It is desirable to store it in a place where temperature fluctuates little.

Because it is a highly reactive, poisonous gas, careful attention should be paid to leakage after use and ventilation in the storage place. Storage of more than 300  $m^3$  legally requires a separate storage facility, which satisfies technical standards, and a permit from the prefectural governor.

- (2) Gas Sampling: The following cautions in addition to those described in the text should be practiced:
  - 1. Provide one pressure regulator specifically for one kind of the standard gas. Clean the installation port when installing it.
  - 2. Substitute gas thoroughly in the pressure-reducing device of the pressure regulator.
  - 3. Make piping as short as possible.
  - 4. Watch residual pressure carefully.
- (3) Handling of Container: A gas container for 10 liters weighs 15-18 kg; one for 40 or 47 liters weighs 60-70 kg. Appropriate safety measures such as safety shoes need to be provided for handling gas containers.

#### 11. METHODS OF MEASURING DUST CONCENTRATION IN FLUE GAS

## 4. Measurement Positions, Sampling Nozzle and Measurement Points

4.1 Measurement Positions: Measurement positions should not be mounted in the bent of the duct or other sections where the cross sectional profiles change abruptly. Such sections may involve flow disturbance or even reverse flow that will prevent the accurate measurement of gas flow speed or proper sampling of dust.

Measurement shall be conducted in areas where measurement is safe and easy. Scaffolds or work platform should be provided when the measurement personnel are to work on ducts installed at high elevation.

In many occasions, measurement points that meet the conditions described in section 4.1 in the main body of this standard are not readily available for measurement. In such cases, the following guidelines shall be observed to install the measurement points.

- Choose a straight and long duct as much as possible, and also choose a vertical, straight duct rather than horizontal, straight duct as much as possible.
- (2) Avoid cross sections close to a bent or to an orifice that chokes the duct abruptly. The measurement points should be as distant as possible from such sections with abrupt changes in the cross sections while being at a distance no less than 1.5 times the duct diameter or no less than 1.5 times the longer side of the rectangular duct from such sections.

The standard issued in 1964 included the statement that the measurement cross sections should be where the flow speed is no less than 5 m/sec. In actual measurement, however, the flow speed was in some occasions less than 5 m/sec at which accurate flow speed measurement was difficult with a Pitot tube. Since a

gas flow speed meter, which will be described later, enables accurate flow speed measurement, this statement is eliminated from the latest revision of this standard.

4.2 Measurement Holes: The size, shape and the position of the measurement hole are important factors for measurement. The previous version stated that the inner diameter of the measurement hole should be approximately 100 mm. Too small a measurement hole will make difficult the installation of various measuring devices through this hole. On the other hand, too large a measurement hole will allow external air to enter the duct or flue gas to escape through the hole after installing the measuring devices. Considering measurement on large-scale ducts in addition to the above, the inner diameter of the measurement hole is revised to approximately 100 to 150 mm.

The latest revision of this standard requires that the clearances between the wall of the measurement hole and the measuring devices installed through the measurement hole shall be stuffed with material such as heat insulator to prevent leakage. The measurement hole shall be opened when measuring and shall be covered when not measuring. The measurement hole cover may be bolted to the hole or may have threads and be capped securely. If the flue gas contains corrosive substances, bolted cover should be preferable.

4.3 Measurement Points: After selecting the section of the duct subjected to measurement, the interior surfaces of the duct shall be checked for caked dust. The dust shall be checked if it is caked on the duct surfaces firmly. The geometrical shape of the duct way through which exhaust flue gas runs shall be obtained. Unless otherwise specified, the duct cross section shall be divided into a suitable number of equal sections based on the shape and size of the duct in accordance with the main body of this standard. Measurement points shall be established in each equally divided section.

The concept in determining the measurement points is that the mean flow speed and mean dust concentration should be measured with a minimum number of measurement points and with a minimum

#### measurement error.

The 1963 version of this standard required that the number of the measurement points should depend on the duct cross sectional area. The revision in 1977 defined the maximum number of measurement points as twenty (20). According to this revision, a circular duct the diameter of which exceeds 4.5 m shall have 20 measurement points regardless of the diameter. The circular cross section shall be divided into equal small sections while the number of the measurement points remains 20.

The number of measurement points for a rectangular or a square duct, the cross sectional area of which is 20 m<sup>2</sup> or larger, have 20 measurement points. Unless otherwise specified, the cross section shall be divided into 20 equal sections regardless of the length of one side of the divided section being equal to 1 m or less. The maximum number of the measurement points for ducts having other cross sectional shapes shall also be 20 following the specification above.

The reason for limiting the maximum number of measurement points to 20 is as follows. If the number of measurement points exceeds 20, measurement of exhaust flue gas could take extremely long time. Changes in the exhaust gas condition during this long measurement period could directly affect the measurement results. In addition, past experience proved that the mean flow speed and the mean dust concentration obtained from several dozens of measurement points differ little from those mean values obtained from measurement points limited to 20. Thus, there is no need to increase the number of measurement point above 20, unless extraordinary channelling or drift is involved. The number of measurement points may be more than 20 if the dust collector performance should be measured precisely or the effect of channelling or drift cannot be ignored.

Depending on the type and concentration of the dust, condition of gas flow and the size of the duct, mean gas flow speed and mean dust concentration can be obtained even if the specifications above are not followed in establishing the measurement points. If it is the case, the number of measurement points may be

reduced. This can be applied to a situation where the duct is straight, the dust concentration is low and the distribution of gas flow speed is symmetrical about the duct center.

Considering these, the remarks of this standard specify the following.

- For small size ducts having cross sectional area of no (1)greater than  $0.25 \text{ m}^2$ , the center of the cross section can be the representative point and can be used as the measurement point. This is applicable to square ducts having the side length no greater than 0.5 m and circular ducts the diameter of which does not exceed 0.56 m, for example. For these small size ducts, past experiences have verified that the measurement values obtained from the center of the duct differ little from the mean value obtained from four measurement points that are established in accordance with this specification. However, data shall be obtained from four measurement points established in accordance with this standard if it is obvious that the data obtained from the center of the duct differs significantly from the mean value obtained from the four measurement points.
- (2) If the flow speed distribution measured in accordance with section 7.3 in the main body of this standard is considered reasonably symmetrical, the number of measurement points for the horizontal duct may be reduced to 1/2 by taking either half of the vertical axis of symmetry. The number of measurement points for the vertical duct may be reduced to 1/4 by taking one-fourth of the cross sectional area. The expression "reasonably symmetrical" in this regard means that the differences in gas flow speed values between the comparable points with respect to the axis of symmetry are within approximately 10%.
  - (a) Horizontal ducts:

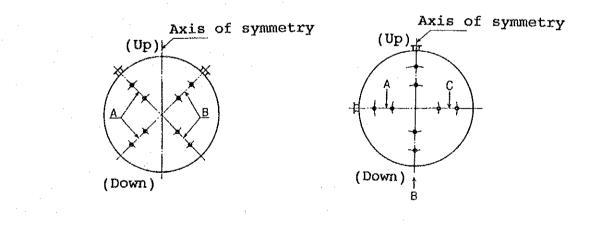
Either half of the cross section with respect to the vertical axis of symmetry will be taken. Generally, the dust concentration is higher in the lower half of

#### A3-11-4

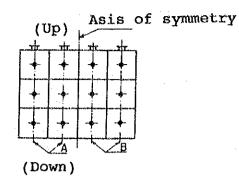
the duct. If the measurement points are established on either of the two perpendicular diameter lines that run 45°C to the horizontal axis, the measurement points are on either line A or line B as shown in Explanatory Figure 3. Thus, the number of the measurement points will be reduced to 1/2. If the measurement points should be on the axis of symmetry, the number of the measurement points will be reduced to 3/4. For rectangular or square ducts, if the number of equally divided sections in the vertical direction is even as shown in Explanatory Figure 4, the measurement points will be reduced to 1/2 and will be established in either side of the axis of symmetry. If the number of the equally divided sections in the vertical direction is odd on the other hand, some measurement points should be established on the axis of symmetry. In this case, the number of the measurement points cannot be reduced to 1/2, but more.

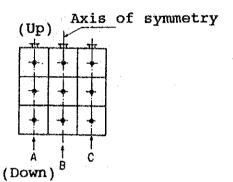
Measuring points are on either line A or line B.

Measuring points are on (either line A or line B) or, (either line C or line B).



Expranatory Figure 3 Example of Circular Sectional Horizontal Duct





(1) In the case the number of equally devided sections are even: Measuring points are on

either line A or line B.

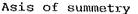
(2) In the case the number of equally devided sections are odd: Measuring points are on Measuring points are on (either line A or line B) or, (either line C or line B).

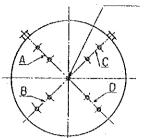
Expranatory Figure 4

Example of Rectangular or Square Square Sectional Horizontal Duct

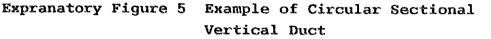
(b) Vertical ducts:

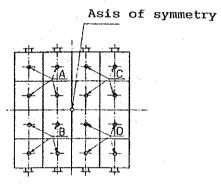
For circular ducts, if the axis of symmetry coincides with the center line of the duct as shown in Explanatory Figure 5, the measurement points will be established on the half length (or radius) of either of the two diameters perpendicular to each other. This reduces the number of the measurement points to 1/4. For rectangular or square ducts, the duct center line may be used as the axis of symmetry as shown in Explanatory Figure 6. If the number of equally divided sections is even, the number of the measurement points will be reduced to 1/4. If the number of equally divided sections on either side of the rectangular is odd on the other hand, the number of the measurement points will be more than that.





Measuring points are on one of the line A, B, C or D.





Axis of symmetry

(1) In the case the number of equally devided sections are even: Measuring points are on one of A, B, C or D.

(2) In the case the number of equally devided sections are odd: Measuring points are on one of A, B, C or D.

Expranatory Figure 6 Example for Rectangular or Square Sectional Vertical Duct

(3) If the concentration distribution has been obtained in accordance with this standard and the mean dust concentration has been obtained from one or more measurement points, such measurement points may be used as the representative points for the subsequent measurement.

The representative points should be the points where the measured dust concentrations at these points are the same as the mean dust concentration. These representative points may be used again as the representative points for the following measurement opportunity only if the exhaust flue gas speed, dust concentration and other values differ little from those values measured when the last representative points were established. As a guideline, "Differing little" in the above statement means that the differences in the comparable measurement values are within 10%, the condition of dust caked on the interior surfaces of the duct has not changed significantly and the operating conditions (type and quantity of fuels, type and quantity of material, etc.) of the source of the exhaust flue gas have not changed significantly.

5. Measurement of Exhaust Flue Gas Temperature: Exhaust flue gas temperature is necessary to calculate exhaust flue gas density which is in turn used to obtain the exhaust flue gas speed by means of a Pitot tube as well as to calculate the exhaust flue gas flow rate and equal speed aspiration flow rate. The flue gas temperature should be measured in the beginning to select the instruments and devices used for measurement of other particulars.

5.1 Measurement Points: Measurement points shall be established in accordance with section 4.3 in the main body of this standard. The number of measurement points may be reduced if the temperature distribution is known to be relatively flat. "Relatively flat" in the above statement means, as a guideline, that adjacent values of the last measurement differ within ±5%.

However, the temperature should be measured at all points as the measurement of the exhaust flue gas itself is simple.

5.2 Measuring Instruments: Among various types of thermometers available, liquid-in-glass thermometers and electrical thermometers are used often. Of the liquid-in-glass thermometers, mercury thermometers with sealed inactive gas are

used frequently.

Some of them are capable of measuring up to 500°C (the boiling point of mercury is 357°C). Electrical thermometers are classified into two types; thermocouple thermometers and resistance thermometers.

Specific thermocouple thermometers will be selected considering the exhaust flue gas temperature while referring to the specifications defined in JIS C 1602 "Thermocouples". Chromelalumel (K) thermometers are useful as exhaust flue gas temperatures are generally below 1,000°C. See Explanatory Table 1.

Resistance thermometers use resistances such as platinum line and thermistor. Changes in temperature is measured as the changes in resistance in these materials (temperature factors). Platinum resistance thermometers, nickel resistance thermometers and thermistor thermometers can measure from -180 to 500°C, -50 to 150°C and -100 to 350°C, respectively.

These electrical thermometers should be calibrated before use.

Symbol Component Material	Former Symbol (Reference)	Wire Diameter mm	Normal Limit °C *1)	Super Heating Limit °C *2
В	#CI	0.50	1 500	1 700
R		0.50	1 400	1 600
S				
K	CA	0.65	650	850
	:	1.00	750	950
		1.60	850	1 050
		2.30	900	1 100
		3.20	1 000	1 200
Е	CRC	0.65	450	500
		1.00	750	950
		1.60	850	1 050
		2.30	900	1 100
		3.20	1 000	1 200
J	IC	0.65	400	500
		1.00	450	550
		1.60	500	650
		2.30	550	750
		3.20	600	750
T	CC	0.32	200	250
		0.65	200	250
		1.00	250	300
		1.60	300	350

#### Explanatory Table 1 Use Limit of Thermocouples

Notes: 1) Normal limit refers to the limit temperatures at which the thermometer can be used continuously in air.

 Superheating limit refers to the limit temperatures at which the thermometer can be used for a short period of time. 5.3 Measurement Methods: Measuring devices are installed through the measurement hole. The temperature sensing point of the probe of the measuring instrument shall be at the point of measurement. The clearances between the measuring devices and measurement hole shall be completely plugged with materials such as asbestos or cloth. External air entering through the measurement hole should be avoided because it causes the exhaust gas to be cooled, resulting in low temperature measurement.

If the exhaust flue gas is toxic or inflammable, satisfactory safety measures shall be taken. Attachment for complete gas sealing should be used.

If the exhaust flue gas pressure is positive and high, suitable safety measures shall be taken as blow-out gas causes burn.

These safety measures should also be applicable to all other measurement activities.

Some temperature measurement takes some time to detect actual temperature of the flue gas.

The exhaust flue gas temperature shall be the mean value of the temperatures obtained at the individual measurement points.

6. Measuring Moisture Content in Exhaust Flue Gas: Moisture content in the exhaust flue gas is necessary for calculating exhaust flue gas density (for exhaust flue gas composition analysis and measurement by a density meter), dry exhaust flue gas flow rate and equal speed aspiration flow rate. The measurement of the moisture content generally follows the exhaust flue gas temperature measurement.

The condenser method specified along with the draft tube method in the old version of this standard is eliminated from the latest revision since they are not currently used.

The latest revision newly includes the section for moisture sampling devices to describe the construction and functions of each component of the devices.