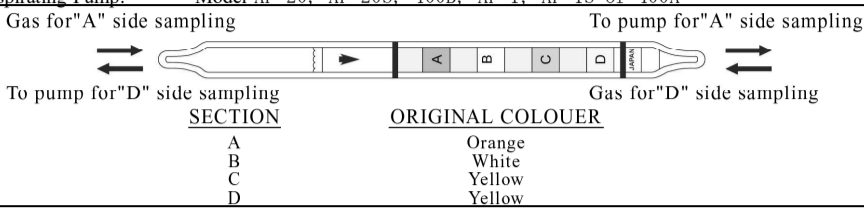


- ★ READ CAREFULLY THIS INSTRUCTION MANUAL AND THE INSTRUCTIONS OF THE ASPIRATING PUMP PRIOR TO USING THIS PRODUCT.
- ★ DON'T DISCARD THIS INSTRUCTION MANUAL UNTIL ALL THE TUBES IN THIS BOX ARE USED UP.

1. PERFORMANCE:

Tube/ box:	10 tubes (5-times use)
Sampling Time:	30seconds ("A"side) +30seconds ("D"side)
Operating temperature:	0-40 °C (32-104°F) (No corrections are necessary.)
Aspirating Pump:	Model AP-20, AP-20S, 400B, AP-1, AP-1S or 400A



CAUTION

1. DETECTOR TUBE CONTAINS REAGENTS.
2. DON'T TOUCH THESE REAGENTS DIRECTLY ONCE TUBES ARE BROKEN.
3. KEEP THE TUBES OUT OF THE REACH OF CHILDREN.

NOTICE

1. USE ONLY PUMP MODELS AP-20, AP-20S, 400B, AP-1, AP-1S OR 400A. OTHERWISE, CONSIDERABLE ERROR IN INDICATION MAY OCCUR.
2. DON'T USE FLOW CONTROL ORIFICE WITH THIS TUBE. (FOR MORE DETAIL, REFER TO THE INSTRUCTIONS OF THE ASPIRATING PUMP.)
3. BEFORE TESTING, CHECK THE ASPIRATING PUMP FOR LEAKS (REF. ITEM 5). ANY PUMPS SHOWING SIGNS OF LEAKAGE SHOULD BE CORRECTED BEFORE USE.
4. DON'T USE THIS TUBE OUTSIDE THE STATED OPERATING TEMPERATURE RANGE.
5. STORE TUBES IN A COOL AND DARK PLACE (0-25 °C/32-77°F), AND USE BEFORE EXPIRATION DATE PRINTED ON TOP OF THE BOX.
6. PRIOR TO USE, READ CAREFULLY ITEM 7 "USER RESPONSIBILITY".
7. READ THE CONCENTRATION IMMEDIATELY AFTER MEASUREMENT.

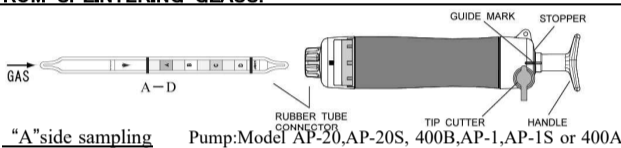
2. SAMPLING AND MEASUREMENT:

This method is required to sample with fresh two tubes of No.186B for one-time analysis.

(1) "A" side sampling

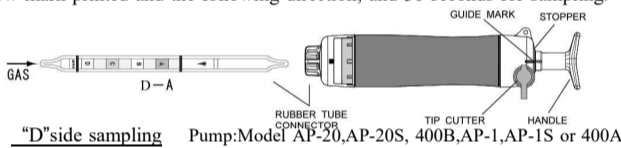
Cut both ends of a fresh tube and connect it to the aspirating pump in accordance with the arrow mark printed and the following direction and take 30 seconds for sampling.

CAUTION SAFETY GLASSES AND GLOVES SHOULD BE WORN TO PREVENT INJURY FROM SPLINTERING GLASS.



(2) "D" side sampling

Cut both ends of another fresh tube and connect it to the aspirating pump in accordance with inversely the arrow mark printed and the following direction; and 30 seconds for sampling.



(3) Analysis

With comparing each section of the sampled two tubes and original colour of an unused tube, confirm the discolouration of the each section. Discriminate kinds of organic in presence with referring to the discolouration and the following CHART1.ORGANIC GAS QUALITATIVE DETECTION CHART.

SPECIAL NOTE:

1. In the stock period, the section "C" of this tube may get a little pale blue stain from the section "D" side. Confirm the stain degree before use of this tube. The following gases which are shown in this instruction manual give a blue (or pale blue) discolouration in the section "C", however, the discolouration is obviously distinguished from the above stain.
 - Ethylene (Over 10ppm)
 - Acetylene (Over 100ppm)
 - Gasoline (Over 0.1mg/L)
 - CO (Over 100ppm)
2. If the discolouration of the section "C" after the sampling is the same as the degree of the stain in the stock period, ignore the discolouration of the section "C" and confirm other sections.
3. On the "D" side sampling, the original colour (Yellow) of the section "C" may become pale a little by sampling of even fresh air. Record it as "Undiscoloured". This is caused by moisture in air. But, this pale colour is obviously distinguished from any discolouration in the section "C" by objective gases such as Styrene (Yellowish dark brown).
4. It is suggested to confirm the discolouration of the each section within 3 minutes. Otherwise, the discolouration may proceed gradually.

CHART 1. ORGANIC GAS QUALITATIVE DETECTION CHART

"A" side sampling Section	"D" side sampling Section				*1) Substances -*2 (X) - -*3 (X, Y) -
	A (Orange)	B (White)	C (Yellow)	D (Yellow)	
Dark brown	Dark brown	—	—	—	1) Propane (100)
			White	—	2) Butane (10)
			—	—	3) Pentane (10)
			—	—	4) Hexane (10)
			—	—	5) Trichloroethylene (10)
			—	—	6) Tetrachloroethylene (100)
			—	—	7) Vinyl chloride
			—	—	8) Butadiene (100)
			—	—	9) Gasoline (0.1mg/L)
			—	—	10) Benzene (10,100)
Greenish brown	Greenish brown	Pale Brown	—	—	11) Toluene (30,200)
			—	—	12) Xylene (60,1000)
			—	—	13) Ethyl benzene (60,400)
			—	—	14) Ethylene (10)
			—	—	15) Acetylene (1000,100)
			—	—	16) Styrene (100)
			—	—	17) Acetone (600)
			—	—	18) Methyl ethyl ketone (100)
			—	—	19) Ethyl acetate (600)
			—	—	20) Butyl acetate (100)
Green	Greenish brown	—	—	—	21) Ethlene oxide (100)
			—	—	22) Formaldehyde (10)
			—	—	23) Kerosine (0.1mg/L)
			—	—	24) Heptane (10)
			—	—	25) Carbon disulphide (100)
			—	—	26) Methyl mercaptan (100,20)
			—	—	27) Methyl alcohol (100)
			—	—	28) 1-Butanol (100)
			—	—	29) Acetaldehyde (100)
			—	—	30) Methyl isobutyl ketone (100)
—	—	—	—	—	31) Ethyl cellosolve (100)
			—	—	32) Tetrahydrofuran (100)
			—	—	33) 1,1,1-Trichloroethane (1000)
			—	—	34) Hydrogen sulphide (100,10)
			—	—	35) Arsine (100,20)
			—	—	36) Isopropyl alcohol (600)
			—	—	37) Carbon monoxide (100)
			—	—	38) Phenol (10)
			—	—	39) Cresol (20)
			—	—	40) Aniline (40)
—	—	41) Ethyl amine (100)			

NOTES:

- (1) —: Undiscoloured
- (2) *1): Item No. for quick reference to details in CHART2.
- (3) *2) (X): Detectable gas concentration limit (Unit:ppm) of "A" side sampling and "Y" means "D" side sampling's one. *3) (X,Y): "X" means detectable gas concentration limit (Unit: ppm) of "A" side sampling and "Y" means "D" side sampling's one. The discolouration length is approx. 0.5 to 1.0 mm
- (4) Substances No.34), 35) and 37) are inorganic gases.

3. GAS-CONCENTRATION LEVEL AND DISCOLOURATION:

After the above discrimination of present gas kinds, it is suggested to use respective gas detector tubes for accurate quantitative analysis. However, it is possible to know gas-concentration levels roughly by confirming degrees of discolouration and referring to the following CHART 2

CHART2. CHART FOR GAS-CONCENTRATION LEVEL AND DISCOLOURATION

Organic Substances	Conc. Level	"A" side sampling		"D" side sampling			
		Section		Section			
		A (Orange)		A (Orange)	B (white)	C (Yellow)	D (Yellow)
1) Propane	H	Dark brown (I)	Dark brown (I)	—	—	—	—
	M	Dark brown (I)	Dark brown (I)	—	—	—	—
	L	—	—	—	—	—	—
2) Butane	H	Dark brown (I)	Dark brown (I)	—	—	—	—
	M	Dark brown (I)	Dark brown (I)	—	—	—	—
	L	Dark brown (III)	Dark brown (III)	—	—	—	—
3) Pentane	H	Greenish brown (I)	Greenish brown (I)	—	—	—	—
	M	Dark brown (I)	Dark brown (I)	—	—	—	—
	L	Dark brown (III)	Dark brown (III)	—	—	—	—
4) Hexane	H	Greenish brown (I)	Greenish brown (I)	—	—	—	—
	M	Dark brown (II)	Dark brown (II)	—	—	—	—
	L	Dark brown (III)	Dark brown (III)	—	—	—	—
5) Trichloroethylene	H	Dark brown (I)	Dark brown (I)	—	—	—	—
	M	Dark brown (II)	Dark brown (II)	—	—	—	—
	L	Dark brown (III)	Dark brown (III)	—	—	—	—
6) Tetrachloroethylene	H	Dark brown (I)	Dark brown (I)	—	—	—	—
	M	Dark brown (III)	Dark brown (III)	—	—	—	—
	L	—	—	—	—	—	—
7) Vinyl chloride	H	Dark brown (I)	Dark brown (I)	—	—	—	—
	M	Dark brown (II)	Dark brown (II)	—	—	—	—
	L	Dark brown (III)	Dark brown (III)	—	—	—	—
8) Butadiene	H	Dark brown (II)	Greenish brown (II)	Yellowish orange (I)	Brown (I)	—	—
	M	Dark brown (III)	Dark brown (III)	—	White (II)	—	—
	L	—	—	—	—	—	—
9) Gasoline	H	Dark brown (I)	Greenish brown (II)	Brown (I)	Pale blue (I)	—	—
	M	Dark brown (III)	Greenish brown (III)	Brown (I)	Pale blue (I)	—	—
	L	Dark brown (III)	Greenish brown (III)	—	Pale blue (II)	—	—
10) Benzene	H	Dark brown (I)	Dark brown (III)	Pale brown (I)	—	—	—
	M	Dark brown (II)	—	Pale brown (I)	—	—	—
	L	Dark brown (III)	—	—	—	—	—
11) Toluene	H	Dark brown (I)	Dark brown (III)	Brown (I)	—	—	—
	M	Dark brown (III)	—	Pale brown (I)	—	—	—
	L	Dark brown (III)	—	—	—	—	—
12) Xylene	H	Dark brown (II)	—	Pale brown (I)	—	—	—
	M	Dark brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
13) Ethyl benzene	H	Dark brown (II)	—	Brown (I)	—	—	—
	M	Dark brown (III)	—	Pale brown (I)	—	—	—
	L	—	—	—	—	—	—
14) Ethylene	H	Dark brown (I)	Dark brown (I)	—	Deep blue (II)	—	—
	M	Dark brown (I)	Dark brown (II)	—	Deep blue (II)	—	—
	L	Dark brown (III)	—	—	Pale blue (II)	—	—
15) Acetylene	H	Dark brown (I)	Dark brown (I)	—	Deep blue (II)	—	—
	M	*Section "C" is also discoloured to Brown (III)	—	—	—	—	—
	L	—	—	—	Pale blue (II)	—	—
16) Styrene	H	Dark brown (III)	—	Dark brown (III)	Yellowish orange (I)	—	—
	M	Dark brown (III)	—	—	Yellowish orange (I)	—	—
	L	—	—	—	—	—	—
17) Acetone	H	Dark brown (III)	—	—	—	—	—
	M	—	—	—	—	—	—
	L	—	—	—	—	—	—
18) Methyl ethyl ketone	H	Dark brown (III)	—	—	—	—	—
	M	Dark brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
19) Ethyl acetate	H	Dark brown (III)	—	—	—	—	—
	M	—	—	—	—	—	—
	L	—	—	—	—	—	—
20) Butyl acetate	H	Dark brown (III)	—	—	—	—	—
	M	Dark brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
21) Ethylene oxide	H	Dark brown (III)	—	—	—	—	—
	M	Dark brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
22) Formaldehyde	H	Greenish brown (I)	—	—	—	—	—
	M	Dark brown (III)	—	—	—	—	—
	L	Dark brown (III)	—	—	—	—	—
23) Kerosine	H	Dark brown (II)	—	—	—	—	—
	M	Dark brown (III)	—	—	—	—	—
	L	Dark brown (III)	—	—	—	—	—
24) Heptane	H	Greenish brown (I)	Greenish brown (I)	—	—	—	—
	M	Greenish brown (II)	Greenish brown (II)	—	—	—	—
	L	Greenish brown (III)	Greenish brown (III)	—	—	—	—
25) Carbon disulphide	H	Greenish brown (I)	Greenish brown (I)	—	—	—	—
	M	Greenish brown (II)	Greenish brown (II)	—	—	—	—
	L	—	—	—	—	—	—
26) Methyl mercaptan	M	Greenish brown (III)	—	—	Deep blue (II)	—	—
	L	—	—	—	Yellowish orange (III)	—	—
	—	—	—	—	—	—	—
27) Methyl alcohol	H	Greenish brown (III)	—	—	—	—	—
	M	Greenish brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
28) 1-Butanol	H	Greenish brown (III)	—	—	—	—	—
	M	Greenish brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
29) Acetaldehyde	H	Green (II)	—	—	—	—	—
	M	Greenish brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
30) Methyl isobutyl ketone	H	Greenish brown (III)	—	—	—	—	—
	M	Greenish brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
31) Ethyl cellosolve	H	Green (III)	—	—	—	—	—
	M	Greenish brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
32) Tetrahydrofuran	H	Green (III)	—	—	—	—	—
	M	Greenish brown (III)	—	—	—	—	—
	L	—	—	—	—	—	—
33) 1,1,1-Trichloroethane	H	Greenish brown (III)	—	—	—	—	—
	M	—	—	—	—	—	—
	L	—	—	—	—	—	—
34) Hydrogen sulphide (H ₂ S)	H	Green (II)	Green (II)	—	Black (II)	—	—
	M	Green (III)	—	—	Black (II)	—	—
	L	—	—	—	Black (III)	—	—
35) Arsine	M	Green (II)	—	—	Black (I)	—	—
	L	—	—	—	Black (III)	—	—
	H	Green (III)	—	—	—	—	—
36) Isopropyl alcohol	M	—	—	—	—	—	—
	H	—	—	—	—	—	—
	L	—	—	—	—	—	—
37) Carbon monoxide (CO)	M	—	—	—	Pale blue (II)	—	—
	L	—	—	—	Pale blue (III)	—	—
	H	—	—	—	—	—	—
38) Phenol	M	—	—	—	—	—	Pale brown (I)
	L	—	—	—	—	—	Pale brown (I)
	H	—	—	—	—	—	Pale brown (I)
39) Cresol	M	—	—	—	—	—	Pale brown (I)
	L	—	—	—	—	—	Pale brown (I)
	H	—	—	—	—	—	Pale brown (I)
40) Aniline	M	—	—	—	—	—	Bluish green (III)
	L	—	—	—	—	—	Bluish green (III)
	H	—	—	—	—	—	Bluish green (III)
41) Ethyl amine	H	—	—	—	—	—	White (I)
	M	—	—	—	—	—	Pale blue (III)
	L	—	—	—	—	—	—

NOTES:

(1) —: Undiscoloured

(2) Conc. Level (Gas concentration level): H; approx. 1000-5000 ppm; M; approx. 100-500 ppm L; approx. 10-50 ppm

(3) Discolouration level: I; The whole layer is discoloured. II; A Half layer is discoloured. III; Approx. 0.5-2.0 mm of the layer is discoloured.

(4) Substances No.34), 35) and 37) are inorganic substances.

4. NON-DISCOLOURATION CONFIRMED SUBSTANCES:

- 1) Carbon tetrachloride 2) Pyridine 3) Methyl bromide
4) Acetic acid 5) Methane 6) Ethane

5. INSPECTION OF ASPIRATING PUMP:

Checking for leaks;

- ① Insert sealed, unbroken detector tube into the pump.
 - ② Align the guide marks on the shaft and stopper of the pump.
 - ③ Pull the handle to full stroke and wait for 1 minute.
 - ④ **Unlock the handle and allow it to return slowly into the pump by holding the cylinder and handle securely.**
- ⚠ CAUTION HANDLE WILL TEND TO SNAP BACK INTO THE PUMP QUICKLY. ⚠**
- ⑤ If the handle returns completely to the original position, the performance is satisfactory.
- Otherwise, refer to maintenance procedure in the pump instructions to correct the fault.

6. CAUTION:

Keep the detector tubes out of the reach of children and used tubes should be discarded carefully according to relevant regulations.

7. USER RESPONSIBILITY:

It is the sole responsibility of the user of this equipment to ensure that the equipment is operated, maintained, and repaired in strict accordance with these instructions and the instructions provided with each Model AP-20, AP-20S, 400B, AP-1, AP-1S or 400A aspirating pump, and that detector tubes are not used which are either beyond their expiration date or have a colour change different to that stated in the Performance specifications. The Manufacturer and Manufacturer's Distributor shall not be otherwise liable for any incorrect measurement or any damages, whether damages result from negligence or otherwise.