

★ READ CAREFULLY THIS INSTRUCTION MANUAL AND THE INSTRUCTIONS OF THE ASPIRATING PUMP PRIOR TO USING THIS PRODUCT.

★ DO NOT DISCARD THIS INSTRUCTION MANUAL UNTIL ALL THE TUBES IN THIS BOX ARE USED UP.

1. PERFORMANCE:

Measuring Range	:125 - 5000 ppm	50 - 2000 ppm (*)	20 - 800 ppm
and Sampling Time	: 45 seconds	1.5 minutes	3 minutes
(*) Graduations on the detector tube are based on 1 pump stroke.			
Number of Pump Stroke	: 1/2 (50mL)	1 (100mL)	2 (200mL)
Colour Change:	: Yellow → Dark brown		
Detectable Limit:	: 10 ppm (2 pump strokes)		
Operating Temperature	: 0 - 40 °C (32-104°F) (Temperature correction is necessary.)		
Aspirating Pump:	: Model AP-20, AP-20S, 400B, AP-1, AP-1S or 400A		

CAUTION

1. THE DETECTOR TUBE CONTAINS CHEMICAL REAGENTS.
2. DO NOT TOUCH THESE REAGENTS DIRECTLY ONCE TUBES WERE 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. BEFORE TESTING, CHECK THE ASPIRATING PUMP FOR LEAKS. (REFER TO ITEM 8. INSPECTION OF ASPIRATING PUMP.) ANY PUMPS SHOWING SIGNS OF LEAKAGE SHOULD BE CORRECTED BEFORE USE.
3. DO NOT USE THIS TUBE BEYOND THE STATED OPERATING TEMPERATURE RANGE.
4. STORE TUBES IN A COOL AND DARK PLACE (0-25 °C/32-77°F), AND USE BEFORE EXPIRATION DATE PRINTED ON THE TOP OF THE BOX.
5. PRIOR TO USE, READ CAREFULLY ITEM 9. USER RESPONSIBILITY.
6. READ THE CONCENTRATION IMMEDIATELY AFTER MEASUREMENT.

2. SAMPLING AND MEASUREMENT:

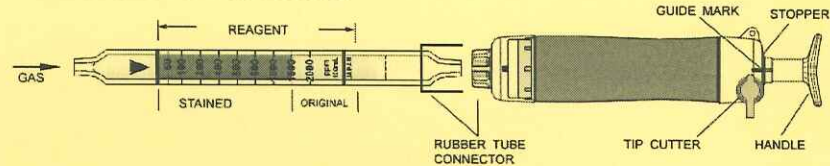


Fig.1

- ① Break both ends of the detector tube.
- CAUTION SAFETY GLASSES AND GLOVES SHOULD BE WORN TO PREVENT INJURY FROM SPLINTERING GLASS.
- ② Insert the detector tube into the aspirating pump securely as shown in Fig.1. (Arrow mark shall point to the pump.)
- ③ Align the guide marks on the shaft and stopper of the aspirating pump.
- ④ Pull the pump handle at a full stroke until it locks and wait for 1.5 minutes or until the completion of sampling is confirmed with the flow indicator of the pump. (See descriptions about the flow indicator in the instruction manual of the pump.)
- ⑤ On completion of sampling, read the scale at the maximum point of the stained layer.
- ⑥ In case of 2 pump strokes, push back the handle without removing the detector tube from the rubber tube connector so that air in the pump will be discharged perfectly. Then repeat the step ③~④ once more.
- ⑦ In this case, read the scale at the maximum point of the stained layer and then multiply the reading value by 0.4 after temperature correction undermentioned. (REFER TO ITEM 3. CORRECTION FOR AMBIENT CONDITIONS.)
- ⑧ If the discolouration is over the full scale (2000ppm), a 1/2 (50mL) pump stroke sampling is available. Insert the new detector tube into the pump inlet and pull the pump handle at a 1/2 pump stroke (to 50mL line), and it will be automatically locked. Leave it for 45 seconds as it is.
- ⑨ Remove the detector tube from the pump and read the scale at the maximum point of the stained layer.
- ⑩ Then multiply the reading value by 2.5 after temperature correction undermentioned. (REFER TO ITEM 3. CORRECTION FOR AMBIENT CONDITIONS.)

- SPECIAL NOTE: I. The scale is calibrated at 20 °C (68°F), 50 %R.H. and 1013hPa. Readings obtained in other circumstances should be corrected. (REFER TO ITEM 3 CORRECTION FOR AMBIENT CONDITIONS.)
- II. When the maximum of the stained layer is unclear or oblique, read the scale at the centre between the longest and shortest points.

3. CORRECTION FOR AMBIENT CONDITIONS:

- ① Temperature; Correct the tube reading by following temperature correction table.

Tube Readings (ppm)	Corrected Concentration (ppm)				
	0 °C (32°F)	10 °C (50°F)	20 °C (68°F)	30 °C (86°F)	40 °C (104°F)
2000	3500	2800	2000	1600	1300
1500	2570	2000	1500	1250	1000
1000	1670	1250	1000	850	700
800	1300	1000	800	700	600
600	1000	800	600	550	450
400	650	500	400	350	300
200	300	200	200	200	200
100	200	100	100	100	100
50	100	50	50	50	50

Note: Temperature correction procedure

Example 1 : When the tube reading is 800 ppm at 10 °C, the concentration is 1000 ppm.

Tube Readings (ppm)	Corrected Concentration (ppm)				
	0 °C (32°F)	10 °C (50°F)	20 °C (68°F)	30 °C (86°F)	40 °C (104°F)
2000	3500	2800	2000	1600	1300
1500	2570	2000	1500	1250	1000
1000	1670	1250	1000	850	700
800	1300	1000	800	700	600
600	1000	800	600	550	450
400	650	500	400	350	300

Example 2 : When the tube reading is 900ppm at 15 °C, the true concentration is 1013 ppm which is found by proportional allotment of each concentration and temperature as shown below.

Tube Readings (ppm)	Corrected Concentration (ppm)				
	0 °C (32°F)	10 °C (50°F)	20 °C (68°F)	30 °C (86°F)	40 °C (104°F)
2000	3500	2800	2000	1600	1300
1500	2570	2000	1500	1250	1000
1000	1670	1250	1000	850	700
800	1300	1000	800	700	600
600	1000	800	600	550	450
400	650	500	400	350	300

(ppm)	10 °C	15 °C	20 °C
1000	1250	1013	1000
900	1125	1013	900
800	1000	900	800

Numerals in parentheses are determined by proportional allotment.

- ② Humidity; No corrections is necessary.
- ③ Atmospheric Pressure;  
True concentration =  $\frac{\text{Temperature corrected concentration} \times 1013}{\text{Atmospheric pressure (in hPa)}}$
4. INTERFERENCE:  
Alcohols, Esters, other Ketones or Aromatic hydrocarbons produce a brown stain and gives higher readings. Aliphatic hydrocarbons (more than C<sub>3</sub>) or Halogenated hydrocarbons change the colour of the whole reagent to brown, but the accuracy of the readings is not affected if the top of the maximum point of dark brown stain is clear.
5. CHEMICAL REACTION IN THE DETECTOR TUBE:  
 $\text{CH}_3\text{COCH}_3 + \text{Cr}^{6+} + \text{H}_2\text{SO}_4 \rightarrow \text{Cr}^{3+}$
6. DISPOSAL OF TUBES:  
USED TUBES SHOULD BE DISPOSED CAREFULLY IN ACCORDANCE WITH RELEVANT REGULATIONS, IF ANY.
7. HAZARDOUS AND DANGEROUS PROPERTIES OF ACETONE:  
TLV-TWA : 200 ppm (NOTICE OF INTENDED CHANGES)  
Explosion range in air : 2.1 - 13 %  
◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2011.
8. INSPECTION OF ASPIRATING PUMP:  
Checking for leaks;  
① Insert a 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 a 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 procedures shown in the instruction manual of the pump to correct the leakage.
9. 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 Distributors shall not be otherwise liable for any incorrect measurement or any damages, whether damages result from negligence or otherwise.

※ Product specifications are subject to change without any prior notice.

Printed in Japan

IME1023/2