

- ★ 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	: 500 - 15000 ppm
and Pump Stroke	: 1/2 pump stroke
Sampling Time	: 45 seconds
Colour Change	: Yellowish Orange → Brownish Green
Detectable Limit	: 75 ppm
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.
4. IF THE CONCENTRATION IS OVER THE FULL SCALE, THE HIGH CONCENTRATION OF METHYL IODIDE REMAINS IN THE ASPIRATING PUMP. BE CAREFUL NOT TO BREATHE THE REMAINING GAS. AFTER MEASUREMENT, THE REMAINING GAS IS PUSHED OUT FROM THE BOTTOM CASE OF THE PUMP WHEN THE HANDLE IS PUSHED BACK AND PULLED. IN CASE OF THE ABOVE, PUSH BACK AND PULL THE HANDLE WITHOUT CONNECTING THE TUBE AT THE LOCAL EXHAUST VENTILATION DEVICE. REPEAT THIS OPERATION AT LEAST FIVE TIMES IN ORDER TO REMOVE THE REMAINING GAS.

### NOTICE

1. USE ONLY WITH 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 OUTSIDE 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:

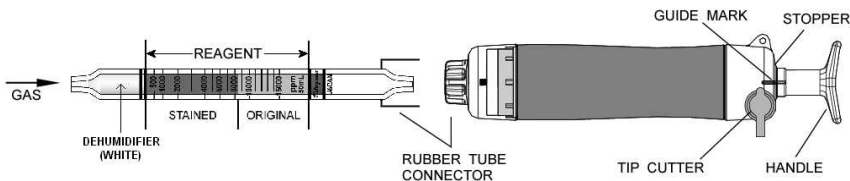


Fig.1

- 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 1/2 pump stroke (to 50mL line) until it locks and wait for 45 seconds 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.

**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 point 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)	Temperature Correction Table				
	Corrected Concentration (ppm)				
	0 °C (32°F)	10 °C (50°F)	20 °C (68°F)	30 °C (86°F)	40 °C (104°F)
15000	19500	17250	15000	12325	9650
14000	18200	16100	14000	11525	9050
13000	16900	14950	13000	10750	8500
12000	15600	13800	12000	9950	7900
11000	14300	12650	11000	9200	7400
10000	13000	11500	10000	8400	6800
9000	11700	10350	9000	7600	6200
8000	10400	9200	8000	6800	5600
7000	9100	8050	7000	6000	5000
6000	7800	6900	6000	5150	4300
5000	6500	5750	5000	4350	3700
4000	5200	4600	4000	3540	3080
3000	3900	3450	3000	2750	2500
2000	2500	2250	2000	1960	1920
1000	1060	1030	1000	1000	1000
500	500	500	500	500	500

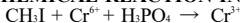
② Humidity; No correction is necessary.

③ Atmospheric Pressure; True concentration = Temperature corrected ×  $\frac{1013}{\text{Atmospheric pressure (in hPa)}}$  concentration

**4. INTERFERENCES:**

60% of Carbon Dioxide does not affect the readings.

**5. CHEMICAL REACTION IN THE DETECTOR TUBE:**



**6. DISPOSAL OF TUBES:**

**USED TUBES SHOULD BE DISPOSED CAREFULLY ACCORDING TO RELEVANT REGULATIONS, IF ANY.**

**7. HAZARDOUS AND DANGEROUS PROPERTIES OF METHYL IODIDE:**

TLV-TWA ◆ : 2 ppm

Explosion range in air : —

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2008.

**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.