

- ★ 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 OF THE TUBES IN THIS BOX ARE USED UP.

**1. PERFORMANCE:**

Measuring Range	: 4 - 40 ppm	2 - 20 ppm(*)	0.4 - 4 ppm
and Sampling Time	: 0.5 minutes	1 minute	5 minutes
(*) Graduations on the detector tube are based on 1 pump stroke.			
Number of Pump Strokes	: 1/2 (50mL)	1 (100mL)	5 (500mL)
Colour Change	: Yellow green → Pink		
Detectable Limit	: 0.2 ppm (5 pump strokes)		
Operating temperature	: 0 - 40 °C (32-104°F) (No temperature correction is necessary.)		
Aspirating Pump	: Model AP-20, AP-20S, 400B, AP-1, AP-1S or 400A		

**CAUTION**

1. DETECTOR TUBE CONTAINS REAGENTS.
2. PRETREAT TUBE CONTAINS REAGENTS.
3. DO NOT TOUCH THE REAGENTS DIRECTLY ONCE TUBES ARE BROKEN.
4. KEEP THE TUBES OUT OF THE REACH OF CHILDREN.

**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 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:**

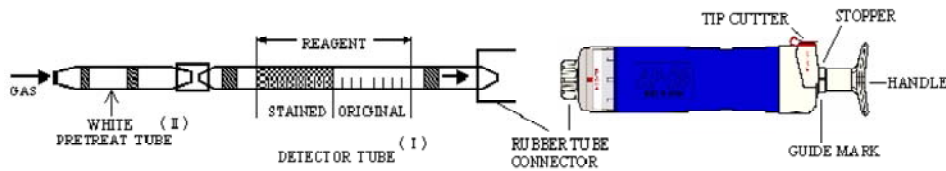


Fig.1

- ① Break both ends of the detector tube (I) and pretreat tube (II) by using the tip cutter, and connect each end of the detector tube (I) and pretreat tube (II) with rubber tube as shown in Fig. 1. (Arrow mark shall point to the pump.)

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

- ② Align the guide marks on the shaft and stopper of the aspirating pump.
- ③ Pull the pump handle at full stroke locked position and wait for 1 minute 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).
- ④ On completion of sampling, read the scale at the maximum point of the stained layer.
- ⑤ When concentrations are below the scale range, multiple pump strokes can be used to determine these lower concentrations. Use 2, 3, 4, or 5 pump strokes, then divide the reading values by each number of the pump strokes in order to obtain the true concentration.
- ⑥ If the discolouration is over the scale, change the tube and carry out the following 1/2 pump strokes procedure:

- 1) Insert a new detector tube (I) and pretreat tube (II) into connecting with rubber tube, to the pump inlet.
- 2) Align the guide marks on the shaft and stopper of the aspirating pump.
- 3) Pull the handle at 1/2 pump stroke locked position (to 50mL line) and wait for 0.5 minutes as it is.
- 4) Remove the detector tube from the pump and read the scale at the maximum point of the stained layer. Then multiply the reading value by 2.

**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 obliquely, read the scale at the centre between the longest and shortest points.

**3. CORRECTION FOR AMBIENT CONDITIONS:**

- ① Temperature; No correction is necessary.
- ② Humidity; No correction is necessary.
- ③ Atmospheric Pressure ;

$$\text{True Concentration} = \text{Tube reading} \times \frac{1013}{\text{Atmospheric pressure (in hPa)}}$$

**4. INTERFERENCE:**

Each coexistence more than 100 ppm of Nitrogen dioxide, 200 ppm of Sulphur dioxide or high concentration of Nitric acid respectively with Hydrogen chloride produces a similar pale discolouration, but does not affect accurate reading. Coexistence of more than 1 ppm of Chlorine gas with Hydrogen chloride produces a similar stain and will give higher reading.

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

PH indicator is discoloured by Hydrogen chloride.

**6. DISPOSAL OF TUBE:**

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

**7. HAZARDOUS AND DANGEROUS PROPERTIES OF HYDROGEN CHLORIDE:**

TLV-C ◆ : 2 ppm

Explosive range in air : —

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2004.

**8. 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 at 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 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, 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.