

- ★ CAREFULLY READ 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	2 - 100 ppm
and Sampling Time:	4.5 minutes (3 pump strokes)
Colour Change:	Yellow → Pale blue
Detectable Limit:	1 ppm
Operating temperature:	0 - 40 °C (32-104°F) (Temperature correction is necessary.)
Aspirating Pump:	Model AP-20, AP-20S, AP-1 or AP-1S

▲ CAUTION

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

NOTICE

1. USE ONLY WITH PUMP MODELS AP-20, AP-20S, AP-1 OR AP-1S. 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 8). ANY PUMPS SHOWING SIGNS OF LEAKAGE SHOULD BE CORRECTED BEFORE USE.
4. DO NOT 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, CAREFULLY READ ITEM 9 "USER RESPONSIBILITY".

2. SAMPLING AND MEASUREMENT:

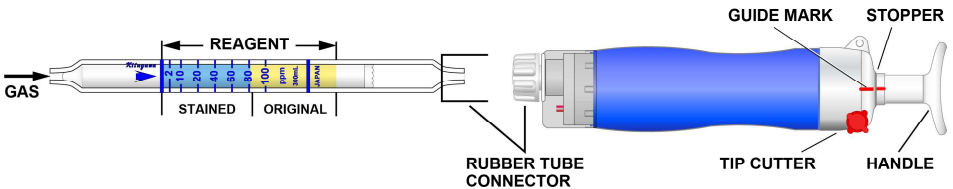


Fig.1

- ① Break both ends of detector tube.

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

- ② Insert the detector tube into 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 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 instructions of the pump).

NOTE: If using Model AP-400, pull pump handle to full stroke and turn the handle by 1/4 (90°), then wait for 1.5 minutes.

- ⑤ Push the handle without removing the detector tube from the inlet, and air in the pump will be discharged perfectly. Then repeat the step ④ twice.
- ⑥ 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) and 1013hPa. Readings obtained in other circumstances should be corrected (REF. ITEM 3).
 - II. When the maximum point of the stained layer is unclear or slanted, read the scale in the middle 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)
100	-	130	100	80	66
80	130	105	80	65	52
60	100	80	60	48	36
40	68	54	40	30	22
20	35	26	20	14	10
10	18	14	10	7	5
2	3	3	2	1	1

- ② Humidity; No corrections are necessary.

- ③ Atmospheric Pressure;

$$\text{True concentration} = \text{Temperature corrected concentration} \times \frac{1013}{\text{Atmospheric pressure (in hPa)}}$$

4. INTERFERENCE:

Alcohols produce similar stains and the coexistence with Methyl cyclohexanone will give higher readings. Paraffin hydrocarbons (more than C₅), Aromatic hydrocarbons or Halogenated hydrocarbons change the whole reagent to Pale brown. Esters change the bottom of stains to Pale brown. Each coexistence of them with Methyl cyclohexanone do not affect the accuracy of the reading values.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:



6. DISPOSAL OF TUBE:

USED TUBES SHOULD BE DISCARDED OF CAREFULLY ACCORDING TO ANY RELEVANT REGULATIONS.

7. HAZARDOUS AND DANGEROUS PROPERTIES OF METHYL CYCLOHEXANONE:

TLV-TWA ◆ : 20 ppm

Explosive range in air : 1.15 ~ %

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2023.

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 to full stroke and wait for 3 minutes. (If using Model AP-400, turn the handle by 1/4 (90°) to lock it.)
- 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.

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 or AP-1S 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.