

- ★ 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:

Measuring Range 1-30ppm 0.5-15ppm(*)
 and Sampling Time : 30 seconds 1 minute

(*) Graduations on the detector tube are based on 1 pump stroke.

Number of pump strokes: 1/2 pump strokes 1 pump stroke

Colour Change : White → Purple

Detectable Limit : 0.2ppm (1 pump stroke)

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 CORROSIVE REAGENTS (CHROMIUM).
2. DO NOT 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 WILL 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 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:

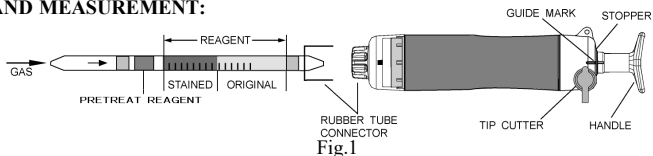


Fig.1

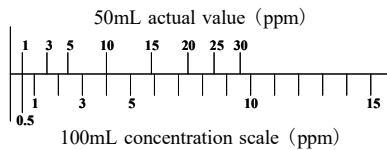
- ① Break both ends of the detector tube.

▲ 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 full stroke locked position and wait for 1 minutes or until the completion of sampling is confirmed with the flow control 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.

REMARKS: Read the concentration within 2 minutes after the completion of sampling. Otherwise, the stained layer may become unclear or fade.

- ⑥ If the discolouration is over the scale, change the tube and pull 1/2 stroke as following.
 - 1) Insert the new tube to the pump inlet. Pull the handle at 1/2 strokes (to 50mL line), and it will be automatically locked. Leave it for 0.5 minutes as it is.
 - 2) Remove the detector tube from the pump and read the concentration.
 - 3) Convert the reading value into an actual concentration by using the following conversion scale.



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 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 ;

$$\text{True concentration} = \text{Reading or Converting value} \times \frac{1013}{\text{Atmospheric pressure (in hPa)}}$$

4. INTERFERENCE:

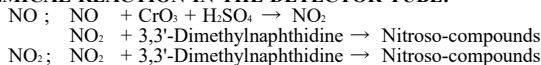
Chlorine or Hydrogen chloride produces a similar stain. Coexistence of Chlorine more than 1ppm gives higher readings. Coexistence of hydrogen chloride does not affect the accuracy of reading value when more than several ppm of Nitrogen oxides exists.

Hydrogen sulphide or Sulphur dioxide does not change the reagent by itself but each coexistence of more than 15ppm respectively with Nitrogen oxides gives lower readings.

Ozone does not change the reagent by itself but the coexistence make the stained layer fade. Furthermore, higher readings are given by Ozone when the concentration coexisted is more than 1/10 times of Nitrogen oxides, and the stained layer is decoloured by Ozone when the concentration coexisted is over more.

n-Hexane does not change the reagent by itself but the coexistence of Nitrogen oxides more than 10 times give higher readings.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:



6. DISPOSAL OF TUBE:

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

7. HAZARDOUS PROPERTY OF NITROGEN OXIDES:

TLV-TWA ◆ Nitrogen oxide (NO) : 25ppm
Nitrogen dioxide (NO₂) : 3ppm

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

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 full stroke and wait for 1 minute.
- ④ Unlock the handle and allow it to return slowly into the pump with 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, 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.