



INSTRUCTION MANUAL HYDROGEN FLUORIDE DETECTOR TUBE

No.156S

- ★ 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	: 0.5 - 30ppm (*)	0.25-15ppm	0.17-2ppm
and Sampling Time	: 3 minutes	6 minutes	9 minutes
(*) Graduations on the detector tube are based on 3 pump strokes.			
Number of pump strokes	: 3 (300mL)	6 (600mL)	9 (900mL)
Colour Change	: Yellowish green → Pink		
Detectable Limit	: 0.05 ppm (9 pump strokes)		
Operating temperature	: 0-40 °C (32-104°F) (Temperature correction is necessary.)		
Operating humidity	: Humidity correction is necessary.		
Aspirating Pump	: Model AP-20, AP-20S, 400B, AP-1, AP-1S, or 400A		

CAUTION

1. DETECTOR TUBE CONTAINS REAGENTS.
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 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 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:

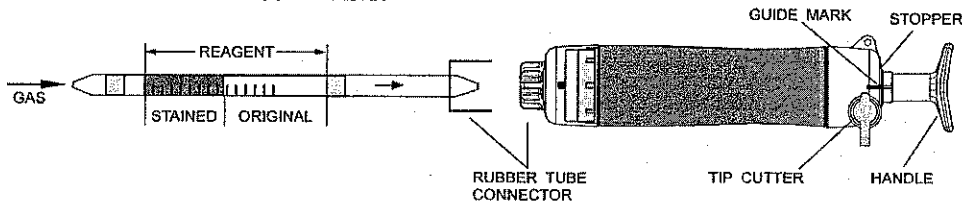


Fig.1

- ① Break both ends of 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 minute 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).
- 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 two times.
- ⑥ On completion of sampling, read the scale at the maximum point of the stained layer.
- ⑦ In case of 6 pump strokes, repeat above pulling and pushing procedures another 3 times after above step ⑤. And multiply the reading value corrected with the undermentioned CORRECTION FOR AMBIENT CONDITIONS, by 1/2.

- ⑧ In case of 9 pump strokes, repeat above pulling and pushing procedures another 6 times after above step ⑤. And multiply the reading value corrected with the undermentioned CORRECTION FOR AMBIENT CONDITIONS, by 1/3.

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 and Humidity; To correct for temperature and humidity, multiply the tube reading by the following factors.

Relative Humidity	Correction factor Table				
	Temperature				
	0°C(32°F)	10°C(50°F)	20°C(68°F)	30°C(86°F)	40°C(104°F)
30%	0.9	0.7	0.6	0.55	0.5
40%	1.6	1	0.8	0.65	0.6
50%	2.6	1.3	1	0.8	0.7
60%	—	2.2	1.5	1.1	0.8
70%	—	—	2.7	1.6	0.9
80%	—	—	—	2.9	1.1

- ② Atmospheric Pressure;

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

4. INTERFERENCES:

Chlorine or Hydrogen chloride produces a similar stain and gives higher readings.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:

PH indicator is discoloured by Hydrogen fluoride.

6. DISPOSAL OF TUBE:

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

7. HAZARDOUS AND DANGEROUS PROPERTIES OF HYDROGEN PEROXIDE:

TLV-TWA. ◆ : 3 ppm (STEL)

◆ 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 to 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 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, 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.