

- ★ READ THIS INSTRUCTION MANUAL AND THE INSTRUCTIONS OF THE ASPIRATING PUMP PRIOR TO USING THIS PRODUCT.
- ★ DO NOT DISCARD CAREFULLY THIS INSTRUCTION MANUAL UNTIL ALL THE TUBES IN THIS BOX ARE USED UP.

1. PERFORMANCE:

Measuring Range	:Hydrogen sulphide	: 1 - 30 ppm
and Pump Stroke	:Mercaptans	
	Methyl mercaptan	: 0.5 - 5.5 ppm
	Ethyl mercaptan	: 0.6 - 5.9 ppm
	n-Propyl mercaptan	: 0.9 - 8.5 ppm
	iso-Propyl mercaptan	: 0.7 - 6.8 ppm
	tert-Butyl mercaptan	: 0.8 - 7.6 ppm

: 1 pump stroke

Sampling Time	:3minutes
Colour Change	:Hydrogen sulphide White → Pale brown :Mercaptans Pale yellow → Pink
Detectable Limit	:Hydrogen sulphide 0.2 ppm :Methyl mercaptan -
Operating Temperature	:0 - 40 °C (32-104°F) (No corrections is necessary.)
Operating Humidity	:Hydrogen sulphide 0 - 100%R.H. (No correction is necessary.) :Mercaptans 0 - 80%R.H. (Humidity 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.

NOTICE

1. USE ONLY WITH 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 OUTSIDE THE STATED OPERATING TEMPERATURE RANGE.
4. STORE TUBES IN A REFRIGERATED PLACE (0-10 °C/32-50°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.
7. USE A HYDROGEN SULPHIDE DETECTOR TUBE AND MERCAPTANS DETECTOR TUBE AS A PAIR. DO NOT USE IT ONLY IN ONE TUBE.

2. SAMPLING AND MEASUREMENT:

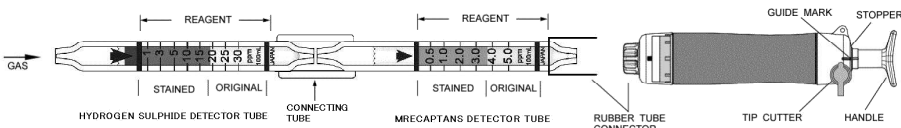


Fig.1

- ① Break both ends of detector tube, and connect each end of detector tubes with a 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 Insert the MERCAPTANS 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 3 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).
- ⑤ On completion of sampling, read the scale at the maximum point of the stained layer.

- SPECIAL NOTE:**
- I. Readings obtained in any 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: No corrections is necessary.
- ② Humidity: Hydrogen sulphide: No corrections is necessary.

Mercaptans: Correct the tube reading by following humidity correction tables.

Readings of Detector tube for Mercaptans (ppm)	Corrected Concentration (ppm)			
	0%R.H.	30%R.H.	50%R.H.	80%R.H.
5.0	5.5	5.5	5.5	5.5
4.0	4.4	4.4	4.4	4.4
3.0	3.3	3.3	3.3	3.3
2.0	2.2	2.2	2.2	2.2
1.0	1.1	1.1	1.1	1.1
0.5	0.5	0.5	0.5	0.5

Readings of Detector tube for Mercaptans (ppm)	Corrected Concentration (ppm)			
	0%R.H.	30%R.H.	50%R.H.	80%R.H.
5.0	7.2	6.4	5.9	5.9
4.0	5.8	5.1	4.7	4.7
3.0	4.3	3.8	3.6	3.6
2.0	2.9	2.5	2.4	2.4
1.0	1.4	1.3	1.2	1.2
0.5	0.7	0.7	0.6	0.6

Readings of Detector tube for Mercaptans (ppm)	Corrected Concentration (ppm)			
	0%R.H.	30%R.H.	50%R.H.	80%R.H.
5.0	13.1	8.5	8.5	7.0
4.0	10.6	6.8	6.8	5.6
3.0	7.9	5.1	5.1	4.2
2.0	5.9	3.4	3.4	2.8
1.0	2.8	1.7	1.7	1.4
0.5	1.5	0.9	0.9	0.7

Readings of Detector tube for Mercaptans (ppm)	Corrected Concentration (ppm)			
	0%R.H.	30%R.H.	50%R.H.	80%R.H.
5.0	11.4	7.6	6.8	6.8
4.0	9.1	6.0	5.4	5.4
3.0	6.9	4.5	4.1	4.1
2.0	4.7	3.0	2.7	2.7
1.0	2.5	1.5	1.3	1.3
0.5	1.3	0.8	0.7	0.7

Humidity Correction Table for tert-Butyl mercaptan				
Readings of Detector tube for Mercaptans (ppm)	Corrected Concentration (ppm)			
	0%R.H.	30%R.H.	50%R.H.	80%R.H.
5.0	11.3	11.3	7.6	6.8
4.0	9.1	9.1	6.0	5.4
3.0	6.9	6.9	4.5	4.1
2.0	4.7	4.7	3.0	2.7
1.0	2.5	2.5	1.5	1.4
0.5	1.3	1.3	0.8	0.7

③ Atmospheric Pressure;

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

4. INTERFERENCES:

Hydrogen sulphide detector tube: Sulphur dioxide does not change the reagent by itself but coexistence of more than a 1/3 time with Hydrogen sulphide produces an unclear stain layer and will give higher readings. Nitrogen dioxide does not change the reagent by itself but coexistence of more than a 1/5 time with Hydrogen sulphide will give lower readings.

Mercaptans detector tube: Nitrogen dioxide of more than 1ppm with Mercaptans gives lower readings. Ammonia does not change the reagent by itself but coexistence of more than 1ppm with Mercaptans fades discolouration from the gas inlet edge and gives lower readings. Coexistence of more than 30ppm of Hydrogen sulphide with Mercaptans gives higher readings.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:

Hydrogen sulphide detector tube : $\text{H}_2\text{S} + \text{Pb}(\text{CH}_3\text{CO}_2)_2 \rightarrow \text{PbS} + 2\text{CH}_3\text{CO}_2\text{H}$

Mercaptans detector tube : By reacting with silver compound, Acidic product is produced and pH indicator is discoloured.

6. DISPOSAL OF TUBE:

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

7. HAZARDOUS AND DANGEROUS PROPERTIES OF HYDROGEN SULPHIDE AND MERCAPTANS:

TLV-TWA ◆ : Hydrogen sulphide: 1 ppm
Methyl mercaptan, Ethyl mercaptan, tert-Butyl mercaptan: 0.5 ppm

Explosion range in air : Hydrogen sulphide: 4.3 - 45 %

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2014.

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.

※ Product specifications are subject to change without any prior notice.