GL Sciences

INSTRUCTION MANUAL
ETHYL ALCOHOL DETECTOR TUBE
METHANOL, ISOPROPYL ALCOHOL

No.104SB

★ 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:

	Ethyl alcohol	Methanol	Isopropyl alcohol
Measuring Range and Pump Stroke	: 20 - 300 ppm : 1 pump stroke	: 20 - 300 ppm : 1 pump stroke	: 20 - 300 ppm : 1 pump stroke
Sampling Time	: 3minutes		
Colour Change	: Pink → White	: Pink → White or Pale Pink	: Pink → White or Pale Pink
Detectable Limit	: 2ppm	: 4ppm	: 4ppm
Operating Temperature	: 0 - 40 ℃ (32-104°F) No corrections is necessary.	: 10 - 35 ℃ (50-95°F) Temperature corrections is necessary.	: 10 - 40 ℃ (50-104°F) Temperature corrections is necessary.
Aspirating Pump	:Model AP-20, AP-20S, 400B, AP-1, AP-1S or 400A		

※ The graduation used for Ethyl alcohol, Methanol and Isopropyl alcohol is the same because this tube has the same sensitivity for these gases.

⚠CAUTION
1. THE PRETREAT TUBE AND DETECTOR TUBE CONTAIN 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 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 ℃/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. ESPECIALLY, WHEN MEASURING METHANOL, TUBE READING VALUE WILL CHANGE TO A HIGHER READING ONE MINUTE AFTER SAMPLING.
7. THE COLOUR OF STAIN LENGTH IN THE TUBE (WHITE OR PALE PINK) MAY DIFFER WITH MANUFACTURING LOT OR TEMPERATURE CONDITION, BUT ACCURACY OF READINGS IS NOT AFFECTED.

2. SAMPLING AND MEASUREMENT:

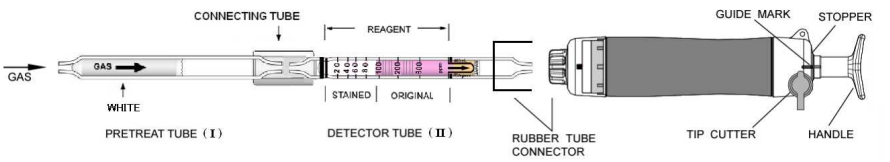

Fig.1

① Break both ends of the pretreat tube (Ⅰ) and detector tube (Ⅱ), and connect each end of the pretreat tube (Ⅰ) and detector tube (Ⅱ) with connecting tube as shown in Fig. 1.

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

② Insert the detector tube (Ⅱ) into the aspirating pump securely as shown in Fig.1. (Arrow marks 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 a 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 instruction manual of the pump.)
⑤ On completion of sampling, read the scale at the maximum point of the stained layer.

SPECIAL NOTE: Ⅰ. The scale is calibrated at 20 ℃ (68°F), 50 %R.H. and 1013hPa. Readings obtained in other circumstances should be corrected. **(REFER TO ITEM 4. 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;

Ethyl alcohol: No Temperature correction is necessary.

Methanol: Temperature correction is necessary. (Operating temperature: 10 - 35 ℃)
The scale is calibrated based on the temperature of 20 ℃ (68°F). Readings obtained in other temperature circumstances should be corrected with the following temperature correction table.

Table of the coefficient for temperature correction : Methanol

Temperature (℃)	0	1	2	3	4	5	6	7	8	9
10	1.10	1.09	1.08	1.07	1.06	1.05	1.04	1.03	1.02	1.01
20	1.00	1.00	0.99	0.99	0.98	0.98	0.97	0.97	0.96	0.96
30	0.95	0.95	0.94	0.94	0.93	0.93	-	-	-	-

Procedure of temperature correction :
Actual reading can be obtained by multiplying reading of tubes by coefficient for temperature correction shown in above table.

Actual Methanol or Isopropyl alcohol concentration (ppm)
= Reading value (ppm) × Coefficient for temperature correction

Procedure to get coefficient for temperature correction from the table.
In case of temperature of 23 ℃, the arrow pointed 0.99 which is found by proportional allotment of 20 ℃ and 3 ℃ in the table is the coefficient for temperature correction.

Temp.(℃)	0	1	2	3	4	5
10	1.10	1.09	1.08	1.07	1.06	1.05
20	1.00	1.00	0.99	0.99	0.98	0.98

Isopropyl ancohol: Temperature correction is necessary. (Operating temperature: 10 - 40 ℃)
The scale is calibrated based on the temperature of 20 ℃ (68°F). Readings obtained in other temperature circumstances should be corrected with the following temperature correction table.

Table of the coefficient for temperature correction : Isopropyl alcohol

Temperature (℃)	0	1	2	3	4	5	6	7	8	9
10	1.20	1.18	1.16	1.14	1.12	1.10	1.08	1.06	1.04	1.02
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	-	-	-	-	-	-	-	-	-

② Humidity; No correction is necessary.

③ Atmospheric Pressure;

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

4. INTERFERENCE:

Alcohols, 1,3-Butadiene, Hydrogen sulphide, Dimethyl sulphide, Isobutylene produce a similar stain and give higher readings. Hexane and Acetone change the whole reagent to white. Coexistence of Ammonia produces unclear stain and gives higher readings.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:

$ROH + KMnO_4 \rightarrow$ White reaction products

6. DISPOSAL OF TUBES:

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

7. HAZARDOUS AND DANGEROUS PROPERTIES OF ALCOHOLS :

TLV ◆	:	Ethyl alcohol	: 1000 ppm (STEL)
	:	Methanol	: 200 ppm (TWA)
	:	Isopropyl alcohol	: 200 ppm (TWA)
Explosion range in air	:	Ethyl alcohol	: 3.5 - 1.9%
	:	Methanol	: 5.5 - 44%
	:	Isopropyl alcohol	: 2.0 - 12%

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2019.

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.

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