

- ★ 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:

Gas to be measured	: Diesel fuel, Jet fuel or Kerosine	
Measuring Range (*1)	: 1 - 30 ppm (*2)	0.5 - 12.5 ppm
and Pump Stroke	: 2 pump strokes	4 pump strokes
(*1) This detector tube is calibrated based on Undecane.		
(*2) Graduations on the detector tube are based on 2 pump strokes.		
Sampling Time	: 3 minutes	6 minutes
Colour Change	: White → Pale green	
Detectable Limit	: 0.3ppm (4 pump strokes)	
Operating Temperature	: 0 - 40 °C (32-104°F) (Temperature correction is necessary.)	
Aspirating Pump	: Model AP-20, AP-20S, 400B, AP-1, AP-1S or 400A	

### CAUTION

1. THE DETECTOR TUBE AND 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 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 °C/32-77°F), AND USE BEFORE EXPIRATION DATE PRINTED ON THE TOP OF THE BOX.
5. PRIOR TO USE, READ ITEM 9. USER RESPONSIBILITY CAREFULLY.
6. READ THE CONCENTRATION IMMEDIATELY AFTER DRAWING THE SAMPLE.
7. THIS DETECTOR TUBE IS CALIBRATED TO UNDECANE.  
CORRELATION OF UNDECANE AND DIESEL FUEL VAPOUR HAS BEEN CONFIRMED BY STANDARD LIGHT OIL USED IN THE EVALUATION OF PETROLEUM PRODUCTS IN JAPAN.  
CALIBRATION OF UNDECANE PROVIDES A USEFUL APPROXIMATION TO MEASURE THE DIESEL FUEL VAPOUR.

### 2. SAMPLING AND MEASUREMENT:

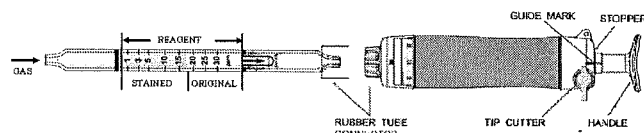


Fig.1

- 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 a 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 instruction manual of the pump.)
- ⑤ Turn the pump handle right or left by 1/4 (90°), push it toward the pump without removing the detector tube from the pump, and repeat the step ③~④ once more.
- ⑥ On completion of sampling, read the scale at the maximum point of the stained layer.
- ⑦ When the concentration is below the scale range, 4 pump strokes can be used to determine concentrations of 0.5 to 12.5 ppm. Then correct the tube reading by correction table. (REFER TO ITEM 3. CORRECTION FOR AMBIENT CONDITIONS AND PUMP STROKE.)

**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 AND PUMP STROKE.)  
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 AND PUMP STROKE:

- ① Temperature; Correct the tube reading by following temperature correction table for 2 pump strokes. In the case of 4 pump strokes, correct the tube reading by following correction table for 4 pump strokes. (The correction table for 4 pump strokes contains temperature correction.)

Tube Readings (ppm)	Corrected Concentration (ppm)			
	0 °C (32°F)	10 °C (50°F)	20 ~ 30 °C (68 ~ 86°F)	40 °C (104°F)
30	24.0	27.0	30.0	31.5
25	20.0	22.5	25.0	26.5
20	16.0	18.0	20.0	21.0
15	12.0	13.5	15.0	16.0
10	8.0	9.0	10.0	10.5
5	4.0	4.5	5.0	5.5
3	2.5	2.7	3.0	3.0
1	1.0	1.0	1.0	1.0

Tube Readings (ppm)	Corrected Concentration (ppm)			
	0 °C (32°F)	10 °C (50°F)	20 ~ 30 °C (68 ~ 86°F)	40 °C (104°F)
30	11.0	12.0	12.5	14.0
25	9.5	10.0	10.5	11.5
20	7.5	8.0	8.5	9.5
15	5.5	6.2	6.5	7.5
10	4.0	4.3	4.5	5.0
5	2.0	2.2	2.3	2.5
3	1.2	1.3	1.3	1.3
1	0.5	0.5	0.5	0.5

- ② Humidity; No correction is necessary.

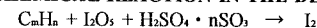
- ③ Atmospheric Pressure ;

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

### 4. INTERFERENCE.

Each coexistence of more than 500 ppm of Propane, 20 ppm of Isobutane, 10 ppm of Hexane, 2 ppm of Octane, 3 ppm of Gasoline or 5 ppm of Carbon monoxide produces a similar stain and will give higher readings. Coexistence of more than 30 ppm of Nitrogen dioxide will give lower readings. Each coexistence of Methane, Acetone, Alcohols, Benzene, Toluene, Xylene, Styrene, Ammonia, Hydrogen chloride, Hydrogen sulphide, Sulphur dioxide or Carbon dioxide does not affect the readings.

### 5. CHEMICAL REACTION IN THE DETECTOR TUBE:



### 6. DISPOSAL OF TUBES:

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

### 7. HAZARDOUS AND DANGEROUS PROPERTIES OF DIESEL FUEL :

TLV-TWA ◆ : 100mg/m<sup>3</sup>

Explosion range in air : 0.7 - 5 %.

◆ Threshold Limit Value established by American Conference of Governmental Industrial Hygienists 2015.

### 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 procedure 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 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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