Kitagawa INSTRUCTION MANUAL No. 280S

ACETYLENE·ETHYLENE DETECTOR TUBES

(C₂H₂, C₂H₄ Separation Measurement)

★ 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	: Acetylene 20 ~ 300 ppm,	Ethylene 200 ~ 2000 ppm
Sampling Time	: 3 minutes	
Graduations on the detector tube apply to 1 pump stroke.		
Colour Change	: Acetylene Yellow → Dark brown,	Ethylene Pale yellow → Blue
Detectable Limit	: Acetylene 0.1 ppm,	Ethylene 1 ppm
Operating temperature:	Acetylene 10-40°C(50-104°F)	(No temperature correction is necessary.)
	: Ethylene 10-40°C(50-104°F)	(Temperature correction is necessary.)
Aspirating Pump	: Model AP-1, 400A or 400	

CAUTION !
1. ACETYLENE DETECTOR TUBE CONTAINS CHEMICAL REAGENTS (POTTASIUM DISULPHATE PALLADATE).
2. ETHYLENE DETECTOR TUBE CONTAINS CHEMICAL REAGENTS (MOLYBDATE).
3. DON'T TOUCH THESE REAGENTS DIRECTLY ONCE TUBES ARE BROKEN.
4. KEEP THE TUBES OUT OF THE REACH OF CHILDREN.

NOTICE

1. THE USE OF ASPIRATING PUMPS OTHER THAN MODELS AP-1, 400A OR 400 MAY CAUSE CONSIDERABLE ERROR IN INDICATION.
2. DON'T USE FLOW CONTROL ORIFICE WITH THIS TUBE. (FOR MORE DETAIL, REFER TO THE INSTRUCTIONS OF THE ASPIRATING PUMP.)
3. BEFORE TESTING, CHECK THE ASPIRATING PUMP FOR LEAKS (REF. ITEM 8). ANY PUMPS SHOWING SIGNS OF LEAKAGE SHOULD BE CORRECTED BEFORE USE.
4. DON'T USE THIS TUBE OUTSIDE THE STATED OPERATING TEMPERATURE RANGE.
5. 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.
6. PRIOR TO USE, READ CAREFULLY ITEM 9 "USER RESPONSIBILITY".
7. METHYL MERCAPTAN, ETHYL MERCAPTAN, iso-PROPYL MERCAPTAN, n-PROPYL MERCAPTAN AND tert-BUTYL MERCAPTAN HAVE THE SAME SENSITIVITY TO THIS MERCAPTANS DETECTOR TUBE.

2. SAMPLING AND MEASUREMENT:

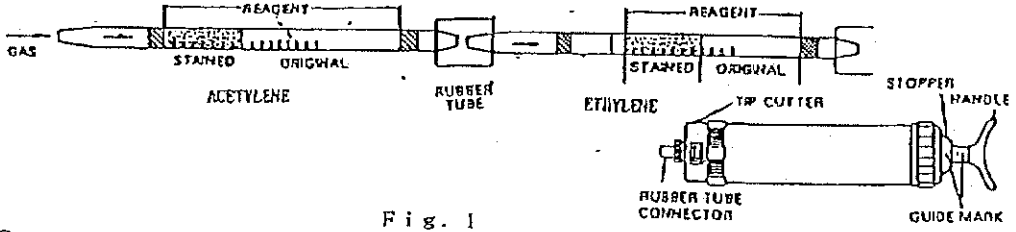

Fig. 1

① Break both ends of each 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 ETHYLENE 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 pump handle to full stroke until it locks and wait for 3 minutes or until confirmation that sampling is completed (See descriptions of the flow indicator in the pump instructions).

NOTE: If using model 400, pull pump handle to full stroke and turn the handle by 1/4 turn to lock, then wait for 3 minutes.

⑤ On completion of sampling, read the scale at the top of the stained layer each detector tubes.

※ Acetylene detector tube can be use alone, but Ethylene one cannot be use alone. Use with connection of Acetylene one without fail.

SPECIAL NOTE: When the top of the stained layer is unclear, read the scale at the centre between the longest and shortest points. The total stain length should be read, even if the stained layer gets multicolour discolouration.

3. CORRECTION FOR AMBIENT CONDITIONS:

① Temperature;
Acetylene : No corrections arenecessary.
Ethylene : The scale is calibrated based on the temperature of 20°C (68°F). Readings obtained in other temperature circumstances should be corrected with the following temperature correction table.

Ethylene Temperature Correction Table

Tube Readings (ppm)	Corrected Concentration (ppm) 10°C (50°F)	20°C (68°F)	30°C (66°F)	40°C (104°F)
2000	1550	2000	———	
1800	1400	1800	2050	
1600	1300	1600	1900	
1400	1150	1400	1600	
1200	1000	1200	1400	
1000	900	1000	1200	
800	750	800	950	
600	600	600	700	

② Humidity: No corrections are necessary.

③ Atmospheric Pressure;

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

4. INTERFERENCES:

Acetylene detector tube: Coexistence of more than 10ppm of Carbon monoxide with Acetylene gives higher readings. Coexistence of less than 5000ppm of Hydrogen or 2000ppm of Ethylene with Acetylene does not affect readings.

Ethylene detector tube: Coexistence of more than 1350ppm of Carbon monoxide or 370ppm of Acetylene with Ethylene gives higher readings. Propylene has the same sensitivity with Ethylene and produces blue stain.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:

Acetylene detector tube: $C_2H_2 + K_2Pd(SO_3)_2 \rightarrow Pd$

Ethylene detector tube: $C_2H_4 + PdSO_4 + (NH_4)_2MoO_4 \rightarrow Mo_3O_8$

6. DISPOSAL OF TUBE:

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

7. HAZARDOUS AND DANGEROUS PROPERTIES OF ACETYLENE AND ETHYLENE:

Explosive range in air: Acetylene 1.5 - 100 %, Ethylene 2.7 - 36 %

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 3 minutes. (If using model 400, turn the handle by 1/4 turn to lock.)

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 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-1, 400A or 400 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 Distributor shall not be otherwise liable for any incorrect measurement or any damages, whether damages result from negligence or otherwise.