INSTRUCTION MANUAL

No.135SA

Kitagawa TETRACHLOROETHYLENE DETECTOR TUBES

★ 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 and Sampling Time:	5 - 150 ppm (1 pump stroke) (2 minutes)	10 - 300 ppm (1/2 pump strokes) (1 minute)

Graduations on the detector tube are based on 2 pump strokes.

Colour Change:	Yellow → Red
Detectable Limit:	1 ppm (2 pump strokes)
Operating temperature:	0 - 40 ℃ (32-104°F) (Temperature correction is necessary.)
Aspirating Pump:	Model AP-1, AP-1S, 400A or AP-400

・CAUTION
1. DETECTOR TUBE CONTAINS REAGENTS.
2. DON'T TOUCH THESE REAGENTS DIRECTLY ONCE TUBES ARE BROKEN.
3. KEEP THE TUBES OUT OF THE REACH OF CHILDREN.

NOTICE
1. USE ONLY WITH PUMP MODELS AP-1, AP-1S, 400A OR AP-400. OTHERWISE, CONSIDERABLE ERROR IN INDICATION MAY OCCUR.
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 DARK AND REFRIGERATED PLACE NOT TO EXCEED 10 ℃ (50°F), AND USE BEFORE EXPIRATION DATE PRINTED ON TOP OF THE BOX.
6. PRIOR TO USE, READ CAREFULLY ITEM **9** "USER RESPONSIBILITY" .

2. SAMPLING AND MEASUREMENT:

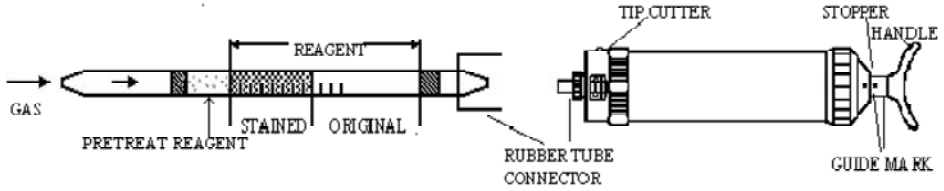

Fig.1

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 2 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).
NOTE: If using Model AP-400, pull pump handle to full stroke and turn the handle by 1/4 (90°), then wait for 2 minutes.
⑤ On completion of sampling, read the scale at the maximum point of the stained layer.
⑥ If the discolouration is over the scale, change the tube and pull 1/2 strokes.

Use of Model AP-1, AP-1S or 400A aspirating pump:
1) Insert the new tube to the pump inlet. Pull the handle at 1/2 strokes (to 50 mℓ line), and it will be automatically locked. Leave it for 1 minute as it is.
2) Remove the detector tube from the pump and read the concentration.
3) Then multiply the reading value by 2.

Use of Model AP-400 aspirating pump:
1) Without connecting the detector tube, pull the handle at 1/2 strokes (to 50 mℓ line).
2) Insert the new tube to the pump inlet and pull the handle fully (to 100 mℓ line). Turn it by 1/4 (90°) to lock it and leave it for 1 minute as it is.
3) Remove the detector tube from the pump and read the concentration.
4) Then multiply the reading value by 2.

SPECIAL NOTE: Ⅰ. The scale is calibrated at 20 ℃ (68°F) and 1013hPa. Readings obtained in other circumstances should be corrected (REF. ITEM 3).
Ⅱ. When the maximum point of the stained layer is unclear, read the scale at the centre between the longest and shortest points.

3. CORRECTION FOR AMBIENT CONDITIONS:

① Temperature; Correct the tube reading by following temperature correction table.

Temperature Correction Table

Tube Readings (ppm)	Corrected Concentration (ppm) 0 ℃ (32°F)	10 ℃ (50°F)	20 ℃ (68°F)	30 ℃ (86°F)	40 ℃ (104°F)
150	—	172	150	138	134
100	144	116	100	92	44
50	70	56	50	46	44
30	40	36	30	28	26
20	22	21	20	19	18
10	10	10	10	10	10

② Humidity; No corrections are necessary.
③ Atmospheric Pressure;

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

4. INTERFERENCES:
Vinyl chloride, Hydrogen chloride, 1,2-Dichloroethylene or Trichloroethylene produces a similar stain and each coexistence respectively with Tetrachloroethylene will give higher readings. Chlorine produces a pale red stain and will give higher readings.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:
$Cl_2C{=}CCl_2+PbO_2+H_2SO_4 \rightarrow HCl$

6. DISPOSAL OF TUBE:
USED TUBES SHOULD BE DISCARDED CAREFULLY ACCORDING TO RELEVANT REGULATIONS, IF ANY.

7. HAZARDOUS AND DANGEROUS PROPERTIES OF TETRACHLOROETHYLENE:
T.L.V.◆ : 25 ppm
Explosive range in air : 10.8 - 54.5%
◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2000.

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 AP-400, turn the handle by 1/4 (90°) to lock it.)
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-1, AP-1S, 400A or AP-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.

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