

# INSTRUCTION MANUAL

No.126B

## Kitagawa CARBON DIOXIDE 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:	0.03 - 0.70 %	100 - 1500 ppm
and Sampling Time:	5 minutes (1 pump stroke)	15 minutes (3 pump strokes)
Colour Change:	Purple blue → Pale pink	
Detectable Limit:	0.005 % (1 pump stroke)	
Operating temperature:	0 - 40 °C (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 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".

### 2. SAMPLING AND MEASUREMENT:

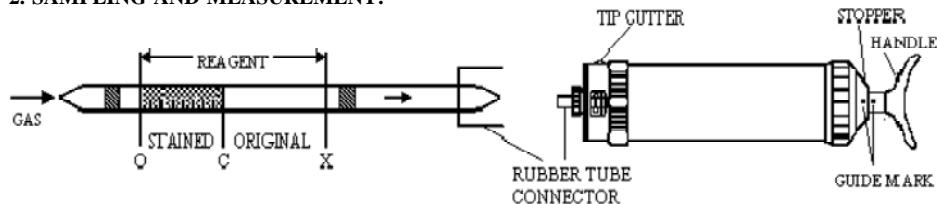


Fig.1

- ① Break both ends of detector tube.

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

- ② And insert the tube end with red dot sealed on the detector tube into the rubber tube connector as shown in Fig. 1.
- ③ Align the guide marks (red dots) on the shaft and stopper of the pump. Pull the handle at a full stroke and wait for 5 minutes.
- ④ Remove the detector tube from the pump inlet on the completion of sampling. Position boundaries between the reagent and glass grain on the line "O" and "X" of CONCENTRATION CHART and read the concentration with the top "C" of length of stain.

**NOTE:** If using Model AP-400, pull pump handle to full stroke and turn the handle by 1/4 (90°), then wait for 5 minutes.

- ⑤ In case of 3pump strokes, push the handle without removing the detector tube from the pump inlet, and air in the pump will be discharged perfectly. Then repeat the step 2 twice again.

**SPECIAL NOTE:** When the top "C" of the stained layer is made obliquely, read the concentration at the center between the longest and shortest points of the stained layer. The total stain length should be read, even if the stained layer gets multi-colour discolouration.

### 3. CORRECTION FOR AMBIENT CONDITIONS:

- ① Temperature; The concentration chart is calibrated based on the tube temperature of 20 °C (68°F), therefore when testing at other temperature, readings from the concentration chart should be corrected with the temperature correction table.
- ② Humidity; No corrections are necessary.
- ③ Atmospheric Pressure;
 
$$\text{True Concentration} = \text{Tube reading} \times \frac{1013}{\text{Atmospheric pressure (in hPa)}}$$

### 4. INTERFERENCES:

More than 100ppm of Sulphur dioxide or more than 20ppm of chlorine produce white stain and more than 30ppm of Nitrogen dioxide produces pale yellow blue stain, but coexistence with more than 300ppm of Carbon dioxide don't affect accurate readings. Hydrogen sulphide doesn't affect accurate readings. Coexistence of more than 120ppm of Hydrogen will give higher readings.

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

The reading for Carbon dioxide detection is composed of a pH sensitive indicator absorbed on Alumina together with Sodium hydroxide.

$$2\text{NaOH} + \text{CO}_2 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$$

### 6. DISPOSAL OF TUBE:

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

### 7. HAZARDOUS AND DANGEROUS PROPERTIES OF CARBON DIOXIDE LENGTH-OF-STAIN:

T.L.V.◆ : 5000 ppm

Explosive range in air : —

◆ 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.**