

Kitagawa CARBON MONOXIDE 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: 30 - 500 ppm (1 pump stroke, 1 minute)
Graduations on the detector tube apply to 1 pump stroke.	
Colour Change	: Yellow → Dark Brown
Detectable Limit	: 10 ppm
Operating temperature	: 0-60°C (32-140°F) (Temperature correction is necessary.)
Aspirating Pump	: Model AP-1, 400A or 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. 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".

2. SAMPLING AND MEASUREMENT:

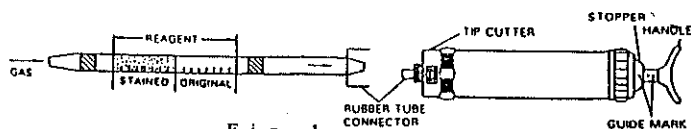


Fig. 1

- 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 pump handle to full stroke until it locks and wait for 1 minute 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 1 minute.
- ⑤ On completion of sampling, read the scale at the top of the stained layer.
SPECIAL NOTE: 1. 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: 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.

Tube Readings (ppm)	Temperature Correction Table						
	Corrected Concentration (ppm)						
	0°C (32°F)	10°C (50°F)	20°C (68°F)	30°C (86°F)	40°C (104°F)	50°C (122°F)	60°C (140°F)
500	400	450	500	550	600	650	700
400	320	360	400	440	480	520	560
300	240	270	300	330	360	380	400
200	160	180	200	220	240	260	280
100	80	90	100	110	120	130	140
50	40	50	50	50	60	65	70
30	30	30	30	30	30	35	40

- ② Humidity: No corrections are necessary.

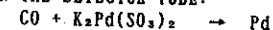
- ③ Atmospheric Pressure:

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

4. INTERFERENCES:

Hydrogen sulfide produces brown stains and coexistence of more than 1/2 of CO give higher readings. Ammonia produces white stains and coexistence of more than 100 times of CO give higher readings. Acetylene produces similar stains and coexistence of more than 1/20 of CO give higher readings. Sulphur dioxide does not change the reagent by itself, although coexistence of more than 1/2 of CO gives higher readings.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:



6. DISPOSAL OF TUBE:

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

7. HAZARDOUS AND DANGEROUS PROPERTIES OF CARBON MONOXIDE:

T.L.V.♦: 25 ppm

Explosive range in air: 12.5 - 74 %

♦ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 1995-1996.

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.