INSTRUCTION MANUAL

No.196S

Kitagawa N,N-DIMETHYL FORMAMIDE 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:	2 - 30 ppm (1 pump stroke) (1 minute)	1 - 15 ppm (2 pump strokes) (2 minutes)

Graduations on the detector tube are based on 1 pump stroke.

Colour Change:	Pale purple → Pale yellow
Detectable Limit:	0.2 ppm (2 pump strokes)
Operating temperature:	10-40 ℃ (50-104°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 ℃/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:

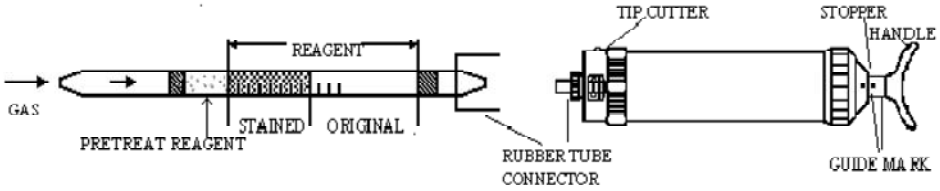

Fig.1

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 the pump handle at full stroke until it locks and wait for 1 minute 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 1 minute.
⑤ On completion of sampling, read the scale at the maximum point of the stained layer.
⑥ In case of 2 pump strokes, push the handle once more without removing the detector tube from the pump inlet, turn it right or left 1/4 and repeat step ④ once.
⑦ In this case, actual concentration is half of the reading value.

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) 10 ℃ (50°F)	15 ℃ (59°F)	20 ℃ (68°F)	40 ℃ (104°F)
30	81	40	30	
25	67	33	25	
20	54	27	20	
15	40	20	15	
10	27	13	10	
5	13	7	5	
2	5	3	2	

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:

Sulpher dioxide or Carbon dioxide does not change the reagent by itself, althouth coexistence of more than 200ppm, 0.1%each with N,N-Dmethyl formamide will give lower readings. Ammonia, Amines or Hydrazine produce similar stains and each coexistence with N,N-Dmethyl formamide will give higher readings.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:

$$HCON(CH_3)_2 + NaOH \rightarrow HN(CH_3)_2 \qquad 2HN(CH_3)_2 + H_3PO_4 \rightarrow [(CH_3)_2NH_2]_2HPO_4$$

6. DISPOSAL OF TUBE:

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

7. HAZARDOUS AND DANGEROUS PROPERTIES OF N,N-DIMETHYL FORMAMIDE:

T.L.V.◆ : 10 ppm
Explosive range in air : 2.2 - 15.2 %
◆ 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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Printed in Japan