



# INSTRUCTION MANUAL AMMONIA DETECTOR TUBE -FOR CLEAN ROOM MONITORING-

No.901NHL

- ★ THIS DETECTOR TUBE IS USED WITH THE EXCLUSIVE USE MODEL S-20 SERIES AIR SAMPLER.
- ★ READ CAREFULLY THIS INSTRUCTION MANUAL AND THE INSTRUCTIONS OF THE SAMPLING PUMP PRIOR TO USING THIS PRODUCT.
- ★ DO NOT DISCARD THIS INSTRUCTION MANUAL UNTIL ALL THE TUBES IN THIS BOX ARE USED UP.

### 1. PERFORMANCE:

Measuring Range	: 1 - 12 $\mu\text{g}/\text{m}^3$ (1.4 ~ 17.2 ppb at 23 °C)
Sampling Volume	: 24000 mL
Sampling Time	: 400mL / min. × 60min.
Colour Change	: Pale purple → Pale yellow
Operating Temperature	: 10 - 40 °C (50-104°F) (No correction is necessary.)
Operating Humidity	: 10 - 90%R.H. (No correction is necessary.)
Sampling Pump	: Model S-20 Series air sampler

### ⚠ CAUTION

1. THE DETECTOR TUBE CONTAINS CHEMICAL REAGENTS.
2. DO NOT TOUCH THESE REAGENTS DIRECTLY ONCE TUBES WERE BROKEN.
3. KEEP THE TUBES OUT OF THE REACH OF CHILDREN.

### NOTICE

1. USE THE AIR SAMPLER AT THE 400mL/min IN FLOW RATE WHEN THE 901NHL AMMONIA DETECTOR TUBE IS CONNECTED.
2. AS THE SAMPLING AND MEASUREMENT PROCEEDED OF EACH SAMPLER IS DIFFERENT, READ THE INSTRUCTION MANUAL OF EACH SAMPLER CAREFULLY BEFORE USE AND THEN MAKE A MEASUREMENT.
3. DO NOT USE THIS TUBE OUTSIDE THE STATED OPERATING TEMPERATURE RANGE.
4. STORE TUBES IN A COOL AND DARK PLACE (0-25 °C/32-77°F), AND USE BEFORE EXPIRATION DATE PRINTED ON THE TOP OF THE BOX.
5. PRIOR TO USE, READ CAREFULLY ITEM 10. USER RESPONSIBILITY.
6. READ THE CONCENTRATION IMMEDIATELY AFTER MEASUREMENT.
7. THIS DETECTOR TUBE CAN BE USED FOR MEASUREMENT OF THE ENVIRONMENT IN A CLEAN ROOM.

### 2. SAMPLING AND MEASUREMENT:

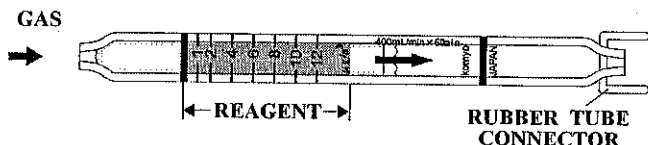


Fig.1

- ① Break both ends of the detector tube with attached ampoule cutter.

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

- ② Connect the detector tube into the rubber tube connector of the Model S-20 series air sampler as shown in Fig. 1 (Arrow mark shall point to the sampler.), and fix it into the detector tube holder.
- ③ Turn ON power of the air sampler.
- ④ In accordance with the instruction manual of each air sampler, preset the TIMER (Hours) at 60 minutes and adjust the sampling flow rate at 400mL/min.
- ⑤ After completion of sampling (60 minutes), remove the detector tube from the tube holder and read the scale at the maximum point of a stained layer.

**SPECIAL NOTE:** I. The scale is calibrated at 23 °C (73.4°F), 50 %R.H. and 1013hPa. Readings obtained in other circumstances should be corrected (REFER TO ITEM 3. CORRECTION FOR AMBIENT CONDITIONS).

- II. When the maximum point of the stained layer is oblique, read the scale at the centre between the longest and shortest points.
- III. It is desirable to read the concentration immediately after measurement because the stained layer becomes light gradually.

### 3. CORRECTION FOR AMBIENT CONDITIONS:

- ① Temperature; No temperature correction is necessary.
- ② Humidity; No correction is necessary.
- ③ Atmospheric Pressure;

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

### 4. CORRECTION OF SAMPLING VOLUME AND SAMPLING TIME

In case that flow rate or sampling time is not 400mL/min. or 60 minutes, the following equation is available to correct the readings.

$$\begin{aligned} \text{True concentration } (\mu\text{g}/\text{m}^3) \\ = \text{Tube reading } (\mu\text{g}/\text{m}^3) \times 400 / \text{Flow rate (mL / min.)} \times 60 / \text{Sampling time (min.)} \end{aligned}$$

※ In case of integrated sampling amount, the following equation is available to correct the readings.

$$\begin{aligned} \text{True concentration } (\mu\text{g}/\text{m}^3) \\ = \text{Tube reading } (\mu\text{g}/\text{m}^3) \times 24 / \text{Integrated amount (L)} \end{aligned}$$

### 5. INTERFERENCE:

Amines produce a similar stain and give higher readings.

### 6. CONVERTING UNIT FROM " $\mu\text{g}/\text{m}^3$ " TO "ppb"

In case that conversion of concentration unit from " $\mu\text{g}/\text{m}^3$ " to "ppb" is requested, the following equation or conversion table are available.

$$\text{ppb} = \mu\text{g}/\text{m}^3 \times 1.436 \quad (\text{at } 23\text{ }^\circ\text{C})$$

**CONCENTRATION CONVERSION TABLE BY THE ABOVE FORMULA**

Tube Readings ( $\mu\text{g}/\text{m}^3$ )	Converted Values (ppb)	Tube Readings ( $\mu\text{g}/\text{m}^3$ )	Converted Values (ppb)	Tube Readings ( $\mu\text{g}/\text{m}^3$ )	Converted Values (ppb)
1	1.4	5	7.2	9	12.9
2	2.9	6	8.6	10	14.4
3	4.3	7	10.1	11	15.8
4	5.7	8	11.5	12	17.2

※ Converted values are rounded off the decimal place.

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

Ammonia changes the colour of indicator reagent by neutralization of acid.

### 8. DISPOSAL OF TUBES:

USED TUBES SHOULD BE DISPOSED CAREFULLY IN ACCORDANCE WITH RELEVANT REGULATIONS, IF ANY.

### 9. HAZARDOUS AND DANGEROUS PROPERTIES OF AMMONIA:

TLV-TWA ◆ : 25 ppm

Explosion range in air : 15 - 28 %

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2008.

### 10. 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 S-20 Series air sampler, 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 Distributors shall not be otherwise liable for any incorrect measurement or any damages, whether damages result from negligence or otherwise.