

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

### 1. PERFORMANCE:

Measuring Range	: 0.05 - 1.0 ppm (62 - 1,250 $\mu$ g/m <sup>3</sup> ) (Printed scale)	0.1 - 2.0 ppm (125 - 2,500 $\mu$ g/m <sup>3</sup> ) (2x Temperature corrected value)
Sampling Volume	: 9 L	4.5 L
Sampling Time	: 300 mL/min x 30min.	300 mL/min x 15min.
Colour Change	: Yellowish Orange $\rightarrow$ Red	
Detectable Limit	: 0.005 ppm (300 mL/min x 30min.)	
Operating Temperature	: 10 - 35 °C (50-95°F) (Temperature correction is necessary.)	
Operating Humidity	: 10 - 90%R.H.	
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. 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.
2. DO NOT USE THIS TUBE OUTSIDE THE STATED OPERATING TEMPERATURE RANGE.
3. STORE TUBES IN A REFRIGERATED PLACE (0-10 °C/32-50°F), AND USE BEFORE EXPIRATION DATE PRINTED ON THE TOP OF THE BOX.
4. PRIOR TO USE, READ CAREFULLY **ITEM 8. USER RESPONSIBILITY.**
5. READ THE CONCENTRATION IMMEDIATELY AFTER MEASUREMENT.
6. THE ORIGINAL COLOUR (TONE OF THE YELLOWISH ORANGE) OF REAGENT IN THE TUBE MAY DIFFER WITH MANUFACTURING LOT, BUT IT CAN BE COMPLETELY DISTINGUISHED FROM PINK STAIN BY FORMALDEHYDE AND ACCURACY OF READINGS IS NOT AFFECTED.

### 2. SAMPLING AND MEASUREMENT:

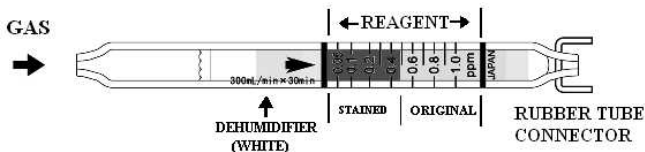


Fig.1

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

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

- ② Insert the detector tube into the rubber tube connector of Model S-20 series air sampler, and fix it into the detector tube holder.
- ③ Turn ON power of Model S-20 series air sampler.
- ④ In accordance with the instruction manual of each air sampler, preset the TIMER (Hours) at 30 minutes and adjust the sampling amount at 300mL/min.
- ⑤ After completion of sampling (30 minutes), remove the detector tube from the tube holder and read the scale at the maximum point of the stained layer.
- ⑥ In case of measuring at the temperature other than 20 °C (68°F) circumstance, obtain temperature correction coefficient from temperature correction table undermentioned and correct readings of detector tube.
- ⑦ If the discolouration is over the scale, preset the TIMER at 15 minutes instead of 30 minutes and repeat through the above procedures (measurement) again.

- ⑧ After completion of sampling (15 minutes), remove the detector tube from the tube holder and read the scale at the maximum point of the stained layer. And, correct the reading value with the temperature correction table undermentioned and multiply the corrected value by 2.

- SPECIAL NOTE:**
- I. The scale is calibrated at 20 °C (68°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 unclear or 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 longer gradually.

### 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.

Temp. (°C)	0	1	2	3	4	5	6	7	8	9
10	1.16	1.14	1.13	1.11	1.10	1.08	1.06	1.05	1.03	1.02
20	1.00	0.98	0.97	0.95	0.94	0.92	0.90	0.89	0.87	0.86
30	0.84	0.82	0.81	0.79	0.78	0.76	-	-	-	-

Procedure of temperature correction :

Actual reading can be obtained by multiplying reading of tubes by coefficient for temperature correction shown in above table.

$$\text{Actual Formaldehyde concentration (ppm)} = \text{Reading value (ppm)} \times \text{Coefficient for temperature correction}$$

Procedure to get coefficient for temperature correction from the table.

In case of temperature of 23 °C, the arrow pointed 0.95 which is found by proportional allotment of 20 °C and 3 °C in the table is the coefficient for temperature correction.

Temp. (°C)	0	1	2	3	4	5
10	1.16	1.14	1.13	1.11	1.10	1.08
20	1.00	0.98	0.97	0.95	0.94	0.92

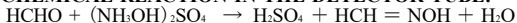
- ② Humidity; No correction is necessary.  
 ③ Atmospheric Pressure;

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

### 4. INTERFERENCE:

Ammonia or Amines itself does not affect the discolouration. But more than 0.5 ppm each of them are coexisting, the stained layer is faded from the zero end of the detecting reagent. (Inlet side of the tube) Nitrogen dioxide produces a similar stains and the coexistence of more than 0.5 ppm cause the maximum point of stained layer to be unclear and gives higher readings. Acetaldehyde or Acetone produces a similar stain and gives higher readings.

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



### 6. DISPOSAL OF TUBES:

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

### 7. HAZARDOUS AND DANGEROUS PROPERTIES OF FORMALDEHYDE:

TLV-STEL ◆ : 0.3 ppm (Ceiling)

Explosion range in air : 7.0 - 73 %

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2013.

### 8. 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.

※ Product specifications are subject to change without any prior notice.