

- ★ 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 ASPIRATING PUMP PRIOR TO USING THIS PRODUCT.
- ★ DO NOT DISCARD THIS INSTRUCTION MANUAL UNTIL ALL OF THE TUBES IN THIS BOX ARE USED UP.

1. PERFORMANCE:

Measuring Range :	0.01 - 0.1 ppm (Printed scale)	0.02 - 0.2 ppm (2×Reading)
Sampling Volume :	4L	2L
Sampling Time :	200mL × 20 min	200mL × 10 min
Colour Change :	White → Redish Purple	
Detectable Limit :	0.002 ppm (at the sampling of 200mL × 20 min)	
Operating Temperature :	0 - 40°C (32-104° F) (Temperature corrections are necessary.)	
Operating Humidity :	20 - 40°C (68-104° F) 5-90%R.H. 0 - at less than 20°C (32-68° F) 20-90%R.H.	
Sampling Pump :	Model S-20 Series	

⚠ 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 COOL AND DARK PLACE (0-25 °C/32-77°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 DRAWING THE SAMPLE.

2. SAMPLING AND MEASUREMENT:

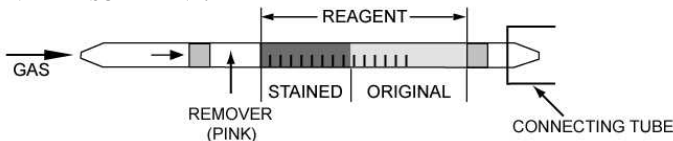


Fig.1

- ① Break both ends of 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 connecting tube 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 Instruction manual of each air sampler, preset the TIMER at 20 minutes and adjust the flow rate at 200mL/min.
 - ⑤ After completion of sampling (20 minutes), remove the detector tube and read the scale at the top of the stained layer.
 - ⑥ In case of measuring at the temperature over than 30 °C (86°F) or at less than 20 °C (68°F) circumstances, obtain temperature correction coefficient from temperature correction table shown at ITEM 3. CORRECTION FOR AMBIENT CONDITIONS, and correct the reading of detector tube.
 - ⑦ If the discolouration is over the scale (0.1 ppm), repeat through ①~⑥ procedure with a new tube at 10 minutes presetting of the TIMER.
 - ⑧ After 10 minutes, turn the sampling pump off, and multiply the temperature corrected concentration of the table reading with the temperature correction table, by 2.
- * With regard to sampling and measuring procedure, it depends on each model of air sampler, therefore

read instruction manual of each instrument carefully and make a measurement.

- SPECIAL NOTE:**
- I. When the maximum point of the stained layer is unclear, read the scale at the longest points of the stained layer. When the end of the stained layer is slanted, read the scale at the centre between the longest and shortest points.
 - II. It is desirable to read the concentration immediately after measurement because the stained layer gets longer gradually.
 - III. **When this tube is used outdoors, shade the reagent of the tube by coloured paper and so on against the sunlight. If this tube is used under the sunlight directly, the sunlight will discolour the reagent, and there is a possibility that influences the accuracy of readings.**

3. CORRECTION FOR AMBIENT CONDITIONS:

① Temperature: To correct for temperature, multiply the tube reading by the following factors.

Temperature (°C)	0	1	2	3	4	5	6	7	8	9
0	0.90	0.90	0.91	0.91	0.92	0.92	0.93	0.93	0.94	0.94
10	0.95	0.95	0.96	0.96	0.97	0.97	0.98	0.98	0.99	0.99
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.02	1.04	1.06	1.08	1.10	1.12	1.14	1.16	1.18
40	1.20	—	—	—	—	—	—	—	—	—

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

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

Procedure to get coefficient for temperature correction from the table.

In case of temperature of 33 °C, the arrow pointed 1.06 which is found by proportional allotment of 30 °C and 3 °C in the table is the coefficient for temperature correction.

Table of the coefficient for temperature correction

Temperature (°C)	0	1	2	3	4	5
20	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.02	1.04	1.06	1.08	1.10

② Humidity; No corrections are necessary.

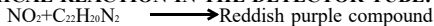
③ Atmospheric Pressure;

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

4. INTERFERENCE:

Each coexistence of Carbon monoxide, Carbon dioxide, Nitrogen monoxide, Formaldehyde, Toluene, Xylene, Ethyl benzene Styrene p-Dichlorobenzene and Acetone with Nitrogen dioxide do not affect the accuracy of readings. Coexistence of more than 0.3 ppm of Sulphur dioxide and 0.2ppm of Ozone gives lower readings.

5. CHEMICAL REACTION IN THE DETECTOR TUBE:



6. DISPOSAL OF TUBES:

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

7. HAZARDOUS AND DANGEROUS PROPERTIES OF NITROGEN DIOXIDE:

TLV-TWA ◆ : 0.3ppm

◆ Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, 2014.

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. 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.

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