GASTEC No.91P Instructions for Formaldehyde Detector Tube

FOR SAFE OPERATION :

Read this manual and the instruction manual of your Gastec Air Sampling Pump carefully.

⚠ CAUTION : If not observed, injuries to the operator or damage to the product may result.

1. When breaking the tube ends, keep away from eyes.
2. Do not touch the broken glass tubes, pieces or reagent with bare hand(s).

△NOTES : For maintaining performance and reliability to the test result.

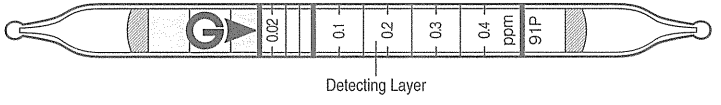
1. Recommend to use Gastec Gas Sampling device Model GSP-300FT-2 (if not available use the equivalent air sampler to sample for 200 mL/min) together with Gastec Detector Tubes only for the purposes specified in the instruction manual of the detector tube.
2. Use this tube under the temperature range of 5 - 35℃ (41 - 95℉).
3. Use this tube under the relative humidity range of 20 - 90%.
4. This tube may be interfered with by the coexisting gases. Please refer to the "INTERFERENCES".
5. Shelf life and storage condition of the tube is marked on the label of the box of tube.

APPLICATION OF THE TUBE :

Use this tube for the detection of Formaldehyde in air of environmental atmospheric condition.

SPECIFICATION :

(As a result of Gastec's commitment to continued improvement, specifications are subject to change without notice.)



Measuring Range	0.02 - 0.4 ppm	0.4 - 1.44 ppm
Sampling Rate	200 mL/min	200 mL/min
Correction Factor	1	3.6
Sampling Time	30 min	10 min
Detection Limit	0.01 ppm	
Colour Change	Yellow → Pink	
Reaction Principle	Formaldehyde reacts with reagent to produce intermediate product which discolours indicator to pink	

Coefficient of Variation: 10%(for 0.02 to 0.1 ppm), 5%(for 0.1 to 0.4 ppm)
****Shelf Life: Please refer to the Validity Date printed on the box of tube.**
****Store the tubes in the refrigerator to keep at 10°C (50°F) or below.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : For 30 minutes measurement to correct for temperature, multiply the scale reading by the correction factor in Table 1.
For 10 minutes measurement to correct for temperature read the corrected temperature value in Table 2.

△NOTES : Use correction table 1 for 30 minutes measurement and use correction table 2 for 10 minutes measurement.

Correction table 1 (30 minutes measurement)

Tips : Apply correction factor in the cell where ones digit and tens digit of ambient temperature cross. For example, if the temperature is 15℃, the correction factor is the number in the cell where "10" row of tens digit and "5" column of ones digit cross. In this case, the correction factor is 1.05.

Tens digit (℃) \ Ones digit (℃)	0	1	2	3	4	5	6	7	8	9
0	—	—	—	—	—	1.38	1.29	1.23	1.18	1.14
10	1.11	1.10	1.08	1.07	1.06	1.05	1.04	1.04	1.03	1.02
20	1.0	0.97	0.94	0.91	0.88	0.85	0.83	0.81	0.80	0.78
30	0.77	0.75	0.74	0.72	0.71	0.70	—	—	—	—

Correction table 2 (10 minutes measurement)

Tube reading (ppm)	Temperature Corrected value (ppm)						
	5℃	10℃	15℃	20℃	25℃	30℃	35℃
0.02	0.045	0.028	0.022	0.020	0.018	0.017	0.016
0.04	0.092	0.058	0.044	0.040	0.036	0.034	0.032
0.06	0.144	0.092	0.069	0.060	0.054	0.051	0.048
0.08	0.199	0.130	0.095	0.080	0.072	0.068	0.064
0.10	0.258	0.171	0.123	0.100	0.090	0.085	0.080
0.15	0.415	0.281	0.195	0.150	0.135	0.128	0.120
0.20	0.584	0.401	0.272	0.200	0.180	0.170	0.160
0.25	0.763	0.531	0.352	0.250	0.225	0.213	0.200
0.30	0.949	0.667	0.436	0.300	0.270	0.255	0.240
0.35	—	0.855	0.509	0.350	0.315	0.298	0.280
0.40	—	1.018	0.593	0.400	0.360	0.340	0.320

Temperature conversion chart

℉	41	42	43	44	45	46	47	48	49	50	51	52	53	54
℃	5.0	5.6	6.1	6.7	7.2	7.8	8.3	8.9	9.4	10.0	10.6	11.1	11.7	12.2

℉	55	56	57	58	59	60	61	62	63	64	65	66	67	68
℃	12.8	13.3	13.9	14.4	15.0	15.6	16.1	16.7	17.2	17.8	18.3	18.9	19.4	20.0

℉	69	70	71	72	73	74	75	76	77	78	79	80	81	82
℃	20.6	21.1	21.7	22.2	22.8	23.3	23.9	24.4	25.0	25.6	26.1	26.7	27.2	27.8

℉	83	84	85	86	87	88	89	90	91	92	93	94	95	
℃	28.3	28.9	29.4	30.0	30.6	31.1	31.7	32.2	32.8	33.3	33.9	34.4	35.0	

Humidity : No correction is required for 20 - 90% R.H.

Pressure : To correct for pressure, multiply by the tube reading by

$$\frac{\text{Tube Reading* (ppm)} \times 1013\ (\text{hPa})}{\text{Atmospheric Pressure (hPa)}}$$

* This value is after other correction(s), if any are applied.

MEASUREMENT PROCEDURE :

If automatic air sampler Model GSP-300FT-2 is used

1. Prior to operation please confirm if black colour inlet rubber tube holder is equipped with the sampler.
2. Break both end of the tips of the detector tube by the tube tip holder supplied. Connect the detector tube to the pump with arrow (⊖►) on the tube pointing toward pump.
3. Set the flow metre at 200 mL/min and timer to "30 minutes" of the sampler. Press the power switch of the sampler to start the sampling.
4. After the sampling, remove the detector tube from the sampler.
5. Read the concentration from the length of discoloration of the tube. If the discoloration exceeded the 0.4 ppm level, prepare fresh detector tube. Reset the sampler at flow rate of 200 mL/min and "10 minutes" of the timer and start the sampling again.
6. For 30 minutes measurement where correction is needed, the detector tube scale reading is multiplied by the correction for temperature, sampling volume and pressure respectively. For 10 minutes measurement where correction is needed, the corrected temperature value is read from the detector tube scale reading, this value is multiplied by the correction for sampling volume and pressure respectively.

Conversion factor of ppm and $\mu g/m^3$

$$\mu g/m^3 = \text{measurement (ppm)} \times \frac{30.03}{22.4} \times \frac{273}{(273+ t)} \times 1000$$

30.03 : molecular weight of formaldehyde
22.4(L) : molecular volume at 1bar, 0℃.
273(K) : K is absolute temperature and 0℃ is 273.15K
Thus, t℃ is converted to (273+ t) K

INTERFERENCES :

Substance	Concentration	Interference	Changes colour by itself to
Ammonia	≦ 2 ppm	No	No discolouration
Nitrogen dioxide	≦ 1 ppm	No	No discolouration
Acetaldehyde		+	Pink
Acetone	≦ 0.3 ppm	No	Pink at inlet
Ethyl Alcohol		No	No discolouration
Ethyl Acetate		No	No discolouration
p-Dichlorobenzene		No	No discolouration
Toluene		No	No discolouration

Scrubber (Black colour) : Removes acetone.Scrubber (Purple colour) : Removes ammonia and nitrogen dioxide. Ammonia discolours purple scrubber colour to yellow. Nitrogen dioxide discolours purple stain to dark purple.

The table of these interference gases primarily expresses the interference of each coexisting gas in the gas concentration range, equivalent to the gas concentration. Therefore, the test result may give a positive result from other substances not listed in the table. If more information is needed please contact us or our distributors in your territory.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2019) : 0.1 ppm
Threshold Limit Value-Short Term Exposure Limit by ACGIH (2019) : 0.3 ppm

DISPOSAL INSTRUCTION :

Reagent of the tube does not use toxic substance. When dispose of tube regardless of used or unused, follow the rules and regulations of the local government.

WARRANTY :

If you have any questions regarding gas detection and quality of the tubes, please feel free to contact your Gastec representatives.

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