

GASTEC Instructions for No.1M Carbon Monoxide Detector Tube

FOR SAFE OPERATION :

Carefully read this manual and the instruction manual of your Gastec Gas Sampling Pump.

⚠ WARNING :

1. Use only Gastec detector tubes in a Gastec pump.
2. Do not interchange or use non-Gastec parts or components in Gastec's detector tube and pump system.
3. Using non-Gastec parts or components in Gastec's detector tube and pump system or using a non-Gastec detector tube with a Gastec pump or using a Gastec detector tube with a non-Gastec pump may damage your detector tube and pump system, or may cause serious injuries, or death to the end-user. It will also void all warranties, and guarantees regarding performance and data accuracy.

⚠ CAUTION : If you do not observe the following precautions, you may suffer injuries or damage the product.

1. When breaking the tube ends, keep away from eyes.
2. Do not touch the broken glass tubes, broken pieces and reagent with bare hand(s).
3. The sampling time represents the time necessary to draw the air sample through the tube. The tube must be positioned in the desired sampling area for the entire sampling time or until the flow finish indicator indicates the end of the sampling.

⚠ NOTES : For maintaining performance and reliability of the test results, observe the following.

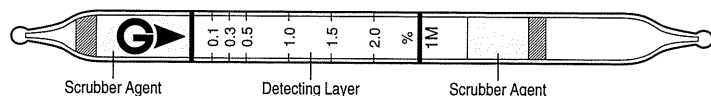
1. Use Gastec Gas Sampling Pump together with Gastec Detector Tubes only for the purposes specified in the instruction manual of the detector tube.
2. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
3. Use this tube within the relative humidity range of 0 - 90%.
4. This tube may be interfered with by the coexisting gases. Please refer to the table "INTERFERENCES" below.
5. The shelf life and storage condition of the tube are marked on the label of the tube box.

APPLICATION OF THE TUBE :

Use this tube for detecting Carbon monoxide in the air or in industrial areas and for determining the environmental atmospheric condition.

SPECIFICATION :

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



Measuring Range	0.05 - 0.1 %	0.1 - 2.0 %	2.0 - 4.0 %
Number of Pump Strokes	2	1	1/2
Stroke Correction Factor	1/2	1	2
Sampling Time	1 minute per pump stroke		30 seconds
Detecting Limit	0.01 % (n=2)		
Colour Change	White → Pale brown		
Reaction Principle	$5CO + I_2O_5 + H_2S_2O_7 \rightarrow I_2$		

Coefficient of Variation : 10% (for 0.1 to 0.5 %), 5% (for 0.5 to 2.0 %)

**** Shelf Life : Please refer to the validity date printed on the tube box.**

**** Store the tubes in dark and cool place.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Temperature : No correction is required.

Humidity : No correction is required.

Pressure : To correct for pressure, use the formula below.

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

MEASUREMENT PROCEDURE :

1. For checking the leakage of the pump, insert a freshly sealed detector tube into pump. Follow instructions provided with the pump operating manual.
2. Break tips off a fresh detector tube with the tube tip breaker in the pump.
3. Insert the tube into the pump inlet with arrow (G) on the tube pointing toward the pump.
4. Make certain the pump handle is all the way in. Align the guide marks on the pump body with the guide marks on the handle.
5. Pull the handle all the way out until it locks at one pump stroke (100 mL). Wait one minute and confirm the completion of the sampling.
6. For smaller measurements less than 0.1 %, repeat the above sampling procedure one more time until the stain reaches the first calibration mark. For measurements higher than 2.0 %, prepare a fresh tube and perform a half pump stroke.
7. Read the concentration level at the interface where the stained reagent meets the unstained reagent.
8. If necessary, multiply the readings by the correction factors of pump strokes and atmospheric pressure.

INTERFERENCES :

Substance	Concentration	Interference	Interference gas only
Acetylene	$\geq 0.1 \%$	+	Blackish brown
Olefins (Ethylene, Propylene)	$\geq 2/3$	+	Pale brown
Butane	$\geq 0.3 \%$	+	Pale brown for whole layer
Propane	$\geq 10 \%$	+	Pale brown for whole layer
Hexane	$\geq 0.1 \%$	+	Pale brown

This table of interference gases primarily expresses the interference of each coexisting gas in the concentration range, that is equivalent to the gas concentration. Therefore, the test result may show positive results due to other substances not listed in the table. If more information is needed, please contact us or Gastec representatives.

APPLICATION FOR OTHER SUBSTANCES :

Tube 1M can also be used for other substances as below :

Substance	Correction Factor	No. of Pump Strokes	Measuring range
Gasoline	1	1	0.1 - 2%

CORRECTION FACTOR :

Detector tubes are primarily designed to measure specific gases. But it is also possible to measure other substances of similar chemical properties with the aid of a correction factor or chart. Therefore, please make use of the correction factor/chart measuring ranges as a reference. For more precise factor please contact your Gastec representatives.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2014) : 25 ppm
Explosive Range : 12.5 – 74 %

INSTRUCTIONS ON DISPOSAL :

The reagent of the tube uses a small amount of hexavalent chromium and selenium. When disposing the tube regardless of whether it has been used or not, follow the rules and regulations of your local government.

WARRANTY :

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