

GASTEC Instructions for No.135 1,1,1-Trichloroethane 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.

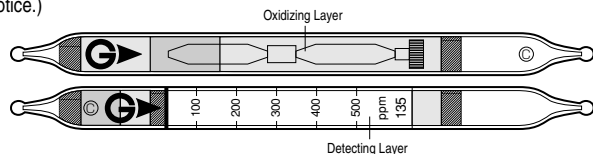
1. Use Gastec Gas Sampling Pump together with Gastec Detector Tubes only for the purposes specified in the instruction manual of the detector tube.
2. Use this tube within the temperature range of 0 - 40°C (32 - 104°F).
3. Use this tube within the relative humidity range of 0 - 90%.
4. This tube may be interfered with by the coexisting gases. Please refer to the table "INTERFERENCES" below.
5. If this tube is exposed under the direct sunlight, whole layer of the tube may be turned to pale yellow, however, this colour change does not affect the tube reading.
6. 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 1,1,1-Trichloroethane 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	100 - 500 ppm	500 - 2000 ppm
Number of Pump Stroke	1	1 / 2
Stroke Correction Factor	1	4
Sampling Time	3 minutes per pump stroke	1.5 minutes
Detecting Limit	50 ppm (n = 1)	
Colour Change	White → Reddish Orange	
Reaction Principle	$\text{CH}_2\text{CCl}_3 + \text{CrO}_3 + \text{H}_2\text{S}_2\text{O}_7 \rightarrow \text{Cl}_2$ $\text{Cl}_2 + 3,3',5,5'\text{-Tetramethylbenzidine} \rightarrow \text{Holoquinone}$	

Coefficient of Variation: 10% (for 100 to 200 ppm), 5% (for 200 to 500 ppm)

****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: Correct for temperature with the table below.

Temperature °C (°F)	0	5	10	15	20	25	30	35	40
	(32)	(41)	(50)	(59)	(68)	(77)	(86)	(95)	(104)
Correction Factor	2.3	1.75	1.4	1.2	1.0	0.85	0.7	0.6	0.5

Humidity : No correction is required.

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

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

MEASUREMENT PROCEDURE :

1. For checking the leakage of the pump, insert a freshly sealed detector tube into the pump. Follow the instructions provided with the pump operation manual.
2. Break the tips off the fresh primary tube and analyser tube by snapping off each tube end in the tube tip breaker of the pump.
3. Connect the © marked ends with rubber tubing after snapping off each end.
4. Insert the analyser tube securely into pump inlet with the arrow (G➔) on the tube pointing toward the pump.
5. 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.
6. Pull the handle all the way out until it locks at one pump stroke (100 mL). Wait three minutes and confirm the completion of the sampling.
7. For measurements higher than 500 ppm, prepare a fresh tube and perform a half pump stroke.
8. Read the concentration level at the interface where the stained reagent meets the unstained reagent.
9. If necessary, multiply the readings by the correction factors of temperature, pump strokes and atmospheric pressure.

INTERFERENCES :

Substance	Interference	Interference gas only
Chlorine, Bromine, Iodine	+	Reddish orange
Chloroform, Dichloromethane	+	Reddish orange
Carbon Tetrachloride	No	No discolouration
Methyl Bromide	+	Reddish orange
Trichloroethylene, Tetrachloroethylene	+	Reddish orange

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 our distributors in your territory.

APPLICATION FOR OTHER SUBSTANCES :

Substance	Correction Factor	No. of pump strokes	Measuring range
1,1-Dichloroethane	0.9	1	90 - 450 ppm
1,2-Dichloroethane	4.0	1	400 - 2000 ppm
Bromochloromethane	0.22	1	22 - 110 ppm

1,1,2-Trichloroethane (ppm)	220	300	400	500	600	700	750
Tube 135 Reading (n=2)	100	200	300	400	500		

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 distributor.

DANGEROUS AND HAZARDOUS PROPERTIES :

Threshold Limit Value-Time Weighted Average by ACGIH (2010): 350 ppm
Threshold Limit Value-Short Term Exposure Limit Value by ACGIH (2010): 450 ppm

INSTRUCTIONS ON DISPOSAL :

The reagent of the primary tube uses a small amount of hexavalent chromium. The reagent of the analyser tube uses a small amount of hexavalent chromium. 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.

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