GASTEC No. 163L Instructions for Ethylene Oxide Detector Tube

FOR SAFE OPERATION:
Carefully read this manual and the instruction manual of your Gastec Gas Sampling Pump.

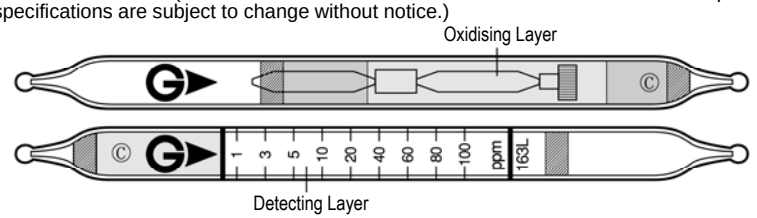
⚠WARNING:
1. Use only Gastec detector tubes in a Gastec pump.
2. Do not interchange or use non-Gastec parts or components in Gastec's detector tube and pump system.
3. Using non-Gastec parts or components in Gastec's detector tube and pump system or using a non-Gastec detector tube with a Gastec pump 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 ethylene oxide 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	0.4 - 1 ppm	1 - 100 ppm	100 - 350 ppm
Number of Pump Strokes	4	2	1
Stroke Correction Factor	0.4	1	3.5
Sampling Time	3 minutes per pump stroke		
Detecting Limit	0.1 ppm (n = 4)		
Colour Change	Yellow → Reddish brown		
Reaction Principle	C_2H_4O → 2HCHO 3HCHO + $(NH_2OH)_3H_3PO_4$ → H_3PO_4 H_3PO_4 + Base → fosfato		

Coefficient of Variation: 15% (for 1 to 20 ppm), 10 % (for 20 to 100 ppm)
**** Shelf Life: Please refer to the validity date printed on the tube box.**

**** Store the tubes at 10°C (50°F) or below in a refrigerator.**

CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE:

Temperature: Correct for temperature with the table below.

Temperature °C (°F)	0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)
Correction Factor	2.8	2.1	1.6	1.35	1.0	0.85	0.75	0.65	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 a fresh primary tube and analyzer tube using the tube tip breaker of the pump.
3. Connect the © marked ends with rubber tubing after snapping off each end.
4. Insert the analyzer 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.
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. Repeat the above sampling procedure one more time.
7. Read the concentration level at the interface where the stained reagent meets the unstained reagent.
8. For measurements less than 1 ppm, repeat the above sampling procedure two more times until the stain reaches the first calibration mark. For measurements higher than 100 ppm, prepare new tube and perform a one-pump stroke.
9. If necessary, multiply the readings by the correction factors of the temperature, pump strokes and atmospheric pressure respectively.

INTERFERENCES:

Substance	Interference	Interference gas only
Aldehydes, Ketones	+	Discolor reddish brown stain

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:
Tube 163L can also be used for other substances as below:

Substance	Correction Factor	No. of Pump Strokes	Measuring Range
Epichlorohydrin	1.2	2	1.2 - 120 ppm
Propylene oxide	1.0	1	1 - 100 ppm

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 (2009): 1 ppm
Explosive range: 3 – 100%

INSTRUCTIONS ON DISPOSAL: The reagent of the tube does not use toxic substances. 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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