

# GASTEC Instructions for No.10 Nitrogen Oxide & Nitrogen Dioxide Detector Tube

## FOR SAFE OPERATION :

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

### ⚠ 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. The use of non-Gastec parts or components in Gastec's detector tube and pump system or use of a non-Gastec detector tube with a Gastec pump or use of a Gastec detector tube with a non-Gastec pump may result in property damage, serious bodily injury, and death; voids all warranties; and voids all performance and data accuracy guaranties.

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

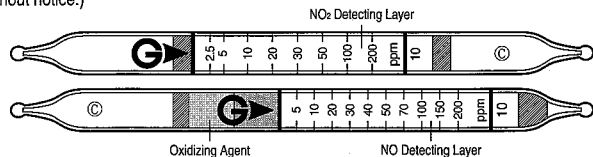
1. When breaking the tube ends, keep away from eyes.
2. Do not touch the broken glass tubes, pieces and reagent with bare hand(s).
3. The sampling time represents the time necessary to draw the air sample through the tube. The tube must be positioned in the desired sampling area for the entire sampling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

### △ NOTES : For maintaining performance and reliability of the test results.

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 "INTERFERENCES".
5. Shelf life and storage conditions of the tube are marked on the label of the box of tube.

**APPLICATION OF THE TUBE :** Use this tube for the detection of Nitric Oxide and Nitrogen Dioxide in air or the industrial areas and environmental atmospheric condition.

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



Name of Gas	Nitrogen Dioxide (NO <sub>2</sub> )	Nitric Oxide (NO)	
Measuring Range	2.5 - 200 ppm	2.5 - 5 ppm	5 - 200 ppm
Pump Strokes	1	2	1
Correction Factor	1	1/2	1
Sampling Time	1 minute per pump stroke		
Detecting Limit	0.5 ppm (n = 1)	1 ppm (n = 2)	
Color Change	White → Yellowish orange		
Reaction Formula	(NO <sub>2</sub> ) Nitrogen dioxide reacts with o-tolidine to produce yellowish orange stain. $\text{NO}_2 + \text{o-Tolidine} \rightarrow \text{Yellowish orange product}$ (NO) Nitric oxide reacts with acid to produce acid gas and acid gas reacts with o-tolidine to produce yellowish orange stain. $\text{NO} + \text{Cr}^6 + \text{H}_2\text{SO}_4 \rightarrow \text{NO}_2$ $\text{NO}_2 + \text{o-Tolidine} \rightarrow \text{Yellowish orange product}$		

**Coefficient of Variation :** NO<sub>2</sub> tube; 10% (for 2.5 to 20 ppm) , 5% (for 20 to 200 ppm)

: NO tube; 10% (for 5 to 20 ppm) , 5% (for 20 to 200 ppm)

\*\* Shelf Life : Please refer to the Validity Date printed on the box of tube.

\*\* Store the tubes under dark and cool place.

## CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE :

Calibration of other Gastec detector Tube No.10 is based on a tube temperature of 20°C (68°F) and not the temperature of the gas being sampled, approximately 50% relative humidity and normal atmospheric pressure.

**Temperature :** NO<sub>2</sub> : No correction is required.

NO : Correct for the temperature by the table below:

Temperature °C (°F)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Correction Factor	1.3	1.1	1.0	0.9	0.8

**Humidity :** No correction is required .

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

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

## MEASUREMENT PROCEDURE :

1. For leak checking of the pump insert a fresh sealed detector tube into pump. Follow instructions provided with the pump operation manual.
  2. Break tips off a fresh detector tubes (NO<sub>2</sub> & NO) by bending each tube end in the tube tip breaker of the pump.
  3. Connect © marked ends with rubber tubing after breaking each end.
  4. Insert the NO tube securely into pump inlet with arrow ➔ on the tube pointing toward pump.
  5. Make certain pump handle is all the way in. Align guide marks on pump body and handle.
  6. Pull handle all the way out until it locks on 1 pump stroke (100ml). Wait 1 minute and confirm the completion of the sampling.
  7. For lower than 5 ppm for NO measurement, repeat the above sampling procedure one more time.
  8. Read concentration at the interface of the stained-to-unstained reagent.
- If correction is needed, multiply the correction factors of temperature, pump strokes, and pressure.

## INTERFERENCES :

### (1) NO<sub>2</sub> Tube

Substance	Concentration	Interference	Changes color by itself to
Carbon monoxide		No effect	Red belt at demarcation
Hydrogen chloride		Unclear demarcation	No discoloration
Ozone, Chlorine dioxide, Halogens	≥ 1/5	20% Plus error	Yellowish orange
Sulfur dioxide	≥ 50 ppm	Unclear demarcation	No discoloration

### (2) NO Tube

Substance	Interference	Changes color by itself to
Hydrogen chloride	No effect	No discoloration
Ozone, Halogens Chlorine dioxide	No effect	No discoloration
Sulfur dioxide	No effect	No discoloration
Nitrogen dioxide	No effect	No discoloration

The table of this interference gases primarily expresses the interference of each coexisting gas in the concentration range, equivalent to the gas concentration. Therefore, the test result may be given positive result by the other substances not listed in the table. For 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 (2004) : NO<sub>2</sub> - 3 ppm, NO - 25 ppm  
 Threshold Limit Value-Short Term Exposure Limit (2004) by ACGIH : 5 ppm

## DISPOSAL INSTRUCTION :

Reagent of the NO tube does not use toxic substances. When disposing the 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.

Manufacturer : Gastec Corporation  
 6431 Fukaya, Ayase-City, 252-1103, Japan

IM0010E2  
 Printed in Japan  
 041Z