

# 133LL

**GASTEC**  
**PERCHLOROETHYLENE (TETRACHLOROETHYLENE)**  
**EXTRA LOW RANGE DETECTOR TUBE**

The Gastec Detector Tube No. 133LL provides a rapid, quantitative analysis of the concentration of PERCHLOROETHYLENE (TETRACHLOROETHYLENE) in air with an accuracy tolerance of  $\pm 25\%$  utilizing the Gastec Multi-Stroke Gas Sampling pump.

**PERFORMANCE:**

Calibration Scale	0.2–3 ppm (based on 1 pump stroke)		
Measuring Range	0.1–0.2 ppm	0.2–3 ppm	3–9 ppm
Number of Pump Stroke	2	1	1/2
Correction Factor	1/2	1	3
Detecting Limit*	0.05 ppm	—	—
Sampling Time	1 minute per pump stroke		
Color Change	Yellow—Purple		

\*Minimum detectable concentration

**SHELF LIFE:**

Please refer to the term of validity on a Tube Box Label.

**MEASUREMENT PROCEDURE:**

- Break tips off a fresh detector tube by bending each tube end in the tube tip breaker of the pump.
- Insert the tube securely into the rubber inlet of the pump with the arrow on the tube pointing toward the pump.
- Make certain the pump handle is all the way in. Align the guide marks on the shaft and pump body.
- Pull the handle all the way out until it locks on 1 pump stroke (100 ml). Wait until staining stops.
- Read concentration at the interface of the stained-to-unstained reagent.
- If the discoloration is before the first calibration mark (1 ppm), repeat the above sampling procedure one more time without removing the tube. Obtain true concentration by dividing the tube reading by 2.  
For repeating pump strokes, the handle must be turned 1/4 turn in either direction to unlock the pump so the handle can be returned to the starting point.
- If the stain exceeds the highest calibration mark (25 ppm), use 1/2 pump stroke (50 ml). Obtain true concentration by multiplying the tube reading by 3.

**CORRECTION FOR TEMPERATURE, HUMIDITY AND PRESSURE:**

Calibration of the Gastec detector tube No. 133LL 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.

- (1) To correct for temperature other than 20°C (68°F), multiply the following correction factor for true concentration:

Temperature	0°C (32°F)	10°C (50°F)	20°C (68°F)	30°C (86°F)	40°C (104°F)
Temperature Correction Factor	2	1.3	1	0.7	0.55

- (2) No correction is required for humidity range of 0–100%.

- (3) To correct for pressure, multiply by

760

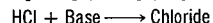
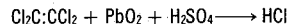
Atmospheric Pressure (mmHg)

**CALIBRATION AND ACCURACY:**

The Gastec detector tube No. 133LL is carefully calibrated as an integral part of the manufacturing process. Calibration and accuracy test are performed using combinations of dynamic diffusion tube method and gas chromatographic technique.

**DETECTION PRINCIPLE:**

Perchloroethylene is decomposed by nascent oxygen generated by oxidizing agent to liberate hydrogen chloride, which discolors Hammett indicator (4-phenylazo-diphenylamine) to pink.

**INTERFERENCES:**

Substance	Concentration	Interference	Changes color by itself to
Bromine, Chlorine		+	} Pink
Hydrogen chloride		+	
Unsaturated halogenated hydrocarbons		+	
Aromatic hydrocarbons	$\leq 100$ ppm	—	} No
Acetone	$\leq 200$ ppm	No	
Nitrogen oxides		No	

**APPLICATION FOR OTHER SUBSTANCES:**

Substance	Correction	No. of pump strokes	Measuring range
Pentachloroethane	Factor: 20	1	20 to 500 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. A correction factor is a figure which is multiplied by the concentration interpreted from the color starting on the detector tube. The correction may also be presented as a chart on tube if the correction relationship is nonlinear. Therefore, please make use of the correction factor/chart measuring ranges as a reference. Moreover, this factor may vary slightly between production batches. For a more precise factor please contact your Gastec distributor.

**DANGEROUS AND HAZARDOUS PROPERTIES:**

Threshold Limit Value-Time Weighted Average by ACGIH (1998): 25 ppm (7–8 hours)  
 Threshold Limit Value-Short Term Exposure Limit by ACGIH (1998): 100 ppm (15 min.)

**NOTE: STORE THE BOX OF TUBES BELOW 10°C, OTHERWISE SHELF LIFE WILL BE SHORTENED.**

SEE OPERATING INSTRUCTIONS INCLUDED WITH THE GASTEC MULTI-STROKE GAS SAMPLING PUMP.