



1. PERFORMANCE

- 1) Measuring range :
 - Oxygen 2-10 %
 - Carbon dioxide 1-20 %
 - Number of pump strokes 1 (100mℓ)
- 2) Sampling time : 8 minutes/1 pump stroke
- 3) Detectable limit : Oxygen 0.1 % Carbon dioxide 0.2 %
- 4) Shelf life : 1.5 years
- 5) Operating temperature : 10 ~ 40 °C
- 6) Temperature compensation :
 - Oxygen Necessary (See "TEMPERATURE CORRECTION TABLE")
 - Carbon dioxide No temperature correction is necessary.
- 7) Reading : Direct reading from the scale calibrated by 1 pump stroke
- 8) Colour change :
 - Oxygen White → Brown
 - Carbon dioxide Pink → Yellow

2. RELATIVE STANDARD DEVIATION

| | | | |
|----------------|----------------|-----------------|-----------------|
| Oxygen | RSD-low : 10 % | RSD-mid. : 10 % | RSD-high : 10 % |
| Carbon dioxide | RSD-low : 10 % | RSD-mid. : 10 % | RSD-high : 10 % |

3. CHEMICAL REACTION

Oxygen : Oxygen reacts with alkaline pyrogallol.
 Carbon dioxide : $\text{CO}_2 + 2\text{KOH} \rightarrow \text{K}_2\text{CO}_3 + \text{H}_2\text{O}$

4. CALIBRATION OF THE TUBE

Oxygen · Carbon dioxide STANDARD GAS CYLINDER METHOD

5. INTERFERENCE AND CROSS SENSITIVITY

Ordinary combustion gases do not affect the reading value and discolouration.

6. CONCENTRATION CORRECTION

On account of interaction of indication between Carbon dioxide and Oxygen, the true concentration is calculated by the following equations.

$$\text{CO}_2 \% = (\text{CO}_2) - \frac{(\text{O}_2) \times (\text{CO}_2)}{100} \text{ ----- equation (1)}$$

$$\text{O}_2 \% = (\text{O}_2) - \frac{(\text{O}_2) \times (\text{CO}_2)}{100} \text{ ----- equation (2)}$$

Where

(CO₂) : indication of carbon (%)

(O₂) : corrected oxygen concentration (%)

[EXAMPLE]

At the measuring temperature of 30 °C, when Oxygen indication is 5 % (temperature corrected value 5.3 %) and Carbon dioxide indication is 10 %, each true concentration is calculated as below.

$$\text{CO}_2 \% = 10 - \frac{5.3 \times 10}{100} = 10 - 0.53 = 9.47$$

$$\text{O}_2 \% = 5.3 - \frac{5.3 \times 10}{100} = 5.3 - 0.53 = 4.77$$

Accordingly true concentration :

Carbon dioxide 9.47 %
 Oxygen 4.77 %

TEMPERATURE CORRECTION TABLE

| Tube Readings (%) | Corrected Oxygen Concentration (%) | | | |
|-------------------|------------------------------------|---------------|---------------|----------------|
| | 10 °C (50 °F) | 20 °C (68 °F) | 30 °C (86 °F) | 40 °C (104 °F) |
| 10.0 | 9.7 | 10.0 | 10.3 | 10.5 |
| 9.0 | 8.7 | 9.0 | 9.3 | 9.5 |
| 8.0 | 7.7 | 8.0 | 8.3 | 8.5 |
| 7.0 | 6.7 | 7.0 | 7.3 | 7.5 |
| 6.0 | 5.7 | 6.0 | 6.3 | 6.5 |
| 5.0 | 4.7 | 5.0 | 5.3 | 5.5 |
| 4.0 | 3.9 | 4.0 | 4.2 | 4.5 |
| 3.0 | 2.9 | 3.0 | 3.1 | 3.3 |
| 2.0 | 2.0 | 2.0 | 2.0 | 2.1 |