Series 8010

Sulphur Dioxide Probe

- **Ideal for measurements in Beers, Wine, Cider, etc.**
- **Fast and accurate response**
- **Highly selective**
- **Robust construction**
- **Easy to use**

General Sulphur Dioxide Measurements

The sulphur dioxide probe Model 8010 enables precise determinations of sulphur dioxide concentrations in solution to be made in minutes.

Applications

The sulphur dioxide probe has been used in a wide range of applications including:

Beverage industry – cider, wine, beer, fruit juices, syrups, soft drinks.

Water – fruit and vegetable washing waters, sulphite in boiler water oxygen control.

Food industry – dried and tinned fruit, yogurt, processed meats, vegetables.

Sugar industry – white sugar, confectionary, molasses.

Theory

The sulphur dioxide probe responds to the partial pressure of sulphur dioxide in the sample solution. When the probe is immersed in a sample, SO_2 is transferred across the gas-permeable membrane until the partial pressure of SO_2 in the internal filling solution equals that in the sample.

The pH of the internal filling solution varies with SO_2 concentration and these pH changes are sensed by the glass electrode. As a result the probe generates a potential related to the SO_2 concentration in the sample given by the Nernst Equation.

ABB Instrumentation

Range

Model 8010 has a linear (Nernstian) response in the range $5x10^{-2}$M to $5x10^{-5}$M SO_2 ($3000mgl^{-1}$ to $3mgl^{-1}$). Measurements can also be made down to the detection limit of $0.3mgl^{-1}$ with careful calibration.

Response Time

The response time of Model 8010 is temperature dependent. At 25°C the response time for a decade change in concentration from 10^{-3} M to 10^{-4} M is typically 2 to 3 minutes for full response.

Temperature

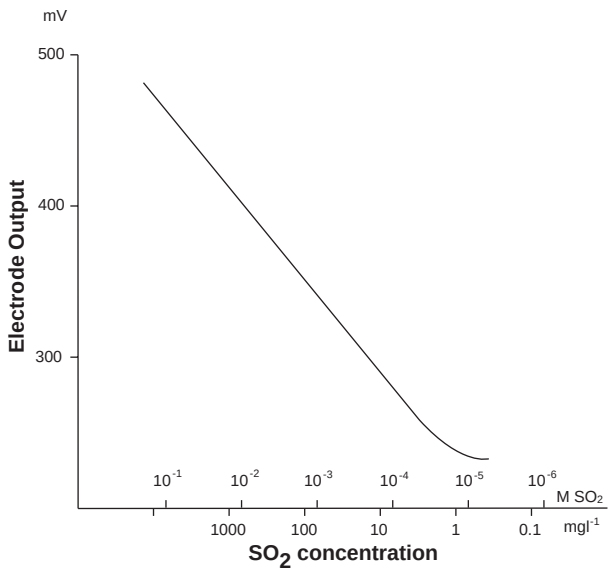
The sulphur dioxide probe can be used over the range 0 to 40°C; within this range it is virtually insensitive to gradual changes in temperature.

Selectivity

The membrane design means that the probe is free from almost all significant interference. The only interference is from volatile acidic species (in particular strong acetic acid). Additionally, the probe is very insensitive to osmotic effects.

Reproducibility

Better than 2% of concentration.



Typical Calibration Curve

Drift

Less than 1mV in 12 hours.

Calibration

A 2-point calibration is recommended with concentration points a decade apart – for example 10ppm and 100ppm. These points can then be plotted on semi-log paper as a calibration curve.

Alternatively, if your pH/mV meter will display concentration directly, then follow meter manufacturer's advice.

Application Advice

'Free' and 'Total' SO_2 Determinations
The sulphur dioxide probe measures the partial pressure of sulphur dioxide in samples. Sulphite, bisulphite and metabisulphite are measured after acidification. The probe provides a direct measurement of the 'free' SO_2 concentration. The 'total' SO_2 concentration may also be measured after a preliminary alkaline treatment. The SO_2 probe makes the measurement of both 'free' and 'total' SO_2 concentration a 10 minute job.

The whole procedure for 'free' SO_2 is simple:

a) Assemble the probe (if not already made up).

b) Make up 2 standard solutions.

c) Acidify standard solutions to <pH 0.7 to release SO_2 in solution.

d) Measure standard solutions and plot curve.

e) Acidify and measure sample.

For 'total' SO_2, simply add strong alkali to the sample for 5 minutes before acidification.

Reference

No reference electrode is needed with the sulphur dioxide probe.

Electrode Range

8010-803 Sulphur Dioxide Probe – BNC
8010-800 Sulphur Dioxide Probe – coaxial

Other terminations are available on request.

For further information please contact your local distributor or our sales office at Stonehouse.

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