

OMS Accuracy Claims

OMS have always claimed their analysers are the most accurate on the market but is there any substance to this claim or is it marketing hype?.

All analysers comprise three parts: the digital voltage measuring device and display: the sensor: the sensor and the user. Each of these play a part in the overall accuracy that can be obtained from any analysing system.

The Digital voltage-measuring device is a standard off the shelf module. 20mV in gives a reading of 20 % The accuracy of this is published and by the display manufacturer and is limited by the last digit. In this case +/- 0.1 As a propriety component it is compensated for battery drift and temperature within specified limits.

Sensors are electrochemical devices and without any electronics they vary 2.5% for every 1°C Temperature compensation is matched so that the sensor is linear and has a constant output over the temperature range. Sensors are readily available that detect parts per billion.

All electrochemical Galvanic sensors are partial pressure device i.e. they detect partial pressure not percentage. The atmospheric pressure is continually changing by small amounts so the stability and accuracy can only be quoted at STP standard temperature and pressure.

For this reason most sensors manufacturers claim an accuracy of +/-1% FSD @STP.

Statements have been made by OMS regarding Teledyne sensors. Without the test methods or test data so far unpublished it is hard to refute the claims. However it is a fact that Teledyne invented the galvanic oxygen sensor in 1965 patented it and are still the worlds leading oxygen sensor supplier to the diving industry. Many of the current diving sensors started life on the Teledyne production line.

Unfortunately the third component the user has the greatest effect on accuracy.

The nearest we can ever get to the perfect measuring situation is to measure the gas at 1Bar, non flowing gas at a constant temperature. Any measurement taken in flowing gases immediately incurs errors. Metal flow controllers/ restrictors such as the first a stage or the Vandagraph DIN Kit used with a flow on for a short time then off can achieve accuracies within +/-1% immediately after calibration. The large metal volume warms the cold cylinder gas to room temperature and the zero flow keeps the sensor at a constant temperature. All continuous flow methods will initially give an accuracy of +/-1% (Adequate for Nitrox) but will all suffer from the sensor cooling down and drifting. Accuracy is improved by calibration between readings. A serious flaw with many analysers is the ability to calibrate an out of specification sensor. Most sensors have a stated nominal output and an expected variation in air at STP. Sensors with an output below this should be rejected by the analyser.

Regardless of OMS claims the speed and accuracy of OMS analysers can be improved by using the Vandagraph Quick-Ox gas sampling method. It is as it implies fast and almost diver proof. It does not take 2 minutes but 10 seconds to achieve an accurate stable reading.

Further reading

Vandagraph website User manual VN202 ; Quick-ox: and DIN kit www.vandagraph.co.uk

Principles of Oxygen Analysis for Divers J.S.Lamb ISBN